PREPARATION FOR THE DEFENSE SYSTEMS ACQUISITION REVIEW COUNCIL

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THESIS

PREPARATION FOR THE DEFENSE SYSTEMS
ACQUISITION REVIEW COUNCIL

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ABSTRACT

The purpose of this thesis is to provide a flexible guide for the project manager, to be used in the preparation of the Defense Systems Acquisition Review Council (DSARC) presentation. The authors have emphasized factors which relate to the non-technical aspects of the presentation because they believe knowledge of these characteristics will substantially aid the project manager. Technical considerations which comprise the framework of any project are also included, but only from a broad viewpoint. Specific detail was avoided because each DSARC review will have its own areas of emphasis. Therefore, the authors consider that a discussion and compilation of the non-technical and technical factors, which this thesis accomplishes, will provide the project manager a base from which to direct the preparation of a DSARC presentation.

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The authors express their gratitude for the thoughtful assistance provided by Mr. David Packard and for the many hours of stimulating and thought provoking interviews held with Department of Defense personnel, in particular, Dr. Peter Waterman and Vice Admiral Eli Reich. The authors also extend their sincere appreciation to Professor Melvin B. Kline of the Naval Postgraduate School, Monterey, California, for guidance in the thesis development and the extremely beneficial criticism offered in comprehensive reviews during the writing of this thesis.

I. INTRODUCTION

The review conducted by the Defense Systems Acquisition Review Council (DSARC) at key system decision points in the acquisition process is held for the purpose of ensuring that the service has a viable program and is ready to proceed to the next phase of acquisition. It is the responsibility of the project manager to provide the DSARC with the pertinent information it needs to make its recommendations regarding the program to the Deputy Secretary of Defense (DEPSECDEF). The DEPSECDEF then makes the key system decision (proceed, modify, or cancel) based in part on the DSARC's recommendation. This high level decision hinges on the effective, impressive, and knowledgeable presentation by the project manager. He must use all the facilities available to him to prepare for the DSARC.

The initial concept of this thesis was to develop a checklist to assist a Navy project manager in his preparation of a DSARC presentation. This concept evolved because the Navy does not use an official checklist in preparing for a DSARC and in the early stages of thesis research the authors considered such a checklist to be an important tool for use by a project manager.

After a significant period of research the development of a "cook-book" type of checklist was deemed inappropriate because of the variability with which the DSARC must

consider each program and each key system decision; a detailed, specific checklist had little meaning. It was still considered, however, that a set of basic guidelines, i.e., a flexible guide, was needed by the Navy project manager.

Further research indicated that the technical aspects of the DSARC presentation were considered in Air Force and Army checklists, but these often immersed themselves in detail and did not address the non-technical considerations in the preparation of a DSARC presentation. Any key system decision is a high level problem which involves behavioral, legal, political, and other non-technical considerations as well as the technical ones. These considerations all directly affect defense management and decision-making. The project manager's presentation will be more effective if he is aware of the importance of knowing how to improve group inter-action through effective communication. This is accomplished by possessing a knowledge of the groups involved, the background for decision-making, and the effects of established procedures.

The authors concluded that a flexible guide which emphasized the non-technical aspects of a DSARC presentation and generalized the technical aspects would provide the greatest assistance to a project manager, in any service, in his preparation of a DSARC presentation. This thesis provides the project manager such a guide.

For the purpose of this thesis, the DSARC review is considered to be the review conducted just prior to any one of

the three key system decisions addressed in DOD Directive 5000.1, i.e., program initiation, transition to engineering development, or transistion to production. This generalization is made specifically to emphasize the level of decision-making and to de-emphasize the detail pertinent to individual key system decisions.

After presenting a brief history of defense decision-making and describing the evolution of the DSARC process, the methods currently used by the services in preparing for a DSARC review are discussed. Then the authors' considerations resulting from: (1) personal interviews with DOD personnel, (2) the analysis of existing checklists and (3) the study of current directives are presented with the intention of showing why knowledge of these considerations is necessary in preparing for a DSARC.

The final chapter of the thesis is a synoptic presentation of the considerations discussed previously; organized in a form which can be readily utilized by the project manager in fulfilling his responsibility for DSARC evolutions.

II. EVOLUTION OF THE DEFENSE SYSTEMS ACQUISITION REVIEW COUNCIL

A. PRE-DOD DIRECTIVE 5000.1

1. Evolution of the Decision-Making Process

Prior to 1947, decisions regarding defense procurement rested primarily with the two executive departments associated with defense, the Department of War (Army and Army Air Corps) and the Department of the Navy (Navy and Marine Corps). Since their problems were in distinctly different operational areas and were of different magnitude, these two departments worked independently with little coordination regarding system acquisition.

As technological capabilities increased and the world environment, with increased international tension, became more complicated, any decision, regarding which de fense system to develop, became more constrained by political considerations than had previously been the cas .

Before World War II the United States followed a policy of strategic mobilization. This policy evolved into one of deterrence because there existed the capability of massive retaliation and, later, controlled response supported by nuclear and conventional forces-in-being. Differences of opinion arose between the services where areas of responsibility concerning strategic operations overlapped. Also, technological advancements outpaced the organizational and management capabilities of the individual armed services

and the military departments could not resolve the conflicts that developed. A change in organization and management was needed.

The need for a change resulted in Congress passing the National Security Act of 1947 which established a new level of coordination above the services. Secretary of War Henry L. Stimson had proposed a single unified military department. Secretary of the Navy James F. Forrestal opposed unification and had proposed a new management layer over the two existing military departments. Authority of the new level of management, suggested by Secretary Forrestal, was limited to coordination. The National Security Act of 1947 followed primarily the views of Secretary Forrestal.

The National Security Act of 1947 established three executive departments, The Department of the Air Force, the Department of the Army and the Department of the Navy. The Secretaries of the three executive departments became, by law, members of the President's cabinet and the National Security Council. The Act did not create a Department of Defense; the three executive departments were called the National Military Establishment. The Head of this organization, however, was called the Secretary of Defense, and he was limited to the exercise of general authority, direction and control. The Secretaries of the three military departments held the powers not specifically delegated to the Secretary of Defense. The Secretary of Defense was

designated the principal assistant to the President in all matters relating to national security.

Secretary of the Navy Forrestal became the first Secretary of Defense and it was his responsibility to develop the organization which he had proposed. The following two years of work with the original organization indicated that the Defense establishment still needed further refinement. Secretary Forrestal proposed to President Truman a change which instituted major milestones in the evolution of the responsibilities of the Secretary of Defense. Secretary Forrestal's proposal resulted in the National Security Act Amendments of 1949.

The amendments redesignated the National Military Establishment as the Department of Defense and established it as an executive department of the government. The Secretary of Defense was provided with full statutory authority for directing and controlling his department. The Secretaries of the Army, Navy and Air Force lost their cabinet status and the Secretary of Defense's authority and responsibility was increased.

In 1953 President Eisenhower expressed his concept of the role of the Secretary of Defense when he said that no DOD function was independent of the Secretary of Defense.

Further legislation, the Reorganization Act of 1958 and an Executive Order in 1961, increased the responsibilities of the Secretary of Defense and provided him with the necessary power for carrying out his assigned responsibilities. The Secretary of Defense now had the authority to

consolidate, transfer, reassign or abolish functions involving common/similar services or supplies, even though such functions had been established by statute. The President, in his Executive Order of 1961, delegated to the Secretary all the functions including the powers, duties and authority contained in the Federal Civil Defense Act of 1950. The above changes finally placed the Secretary of Defense in a powerful position as principal assistant to the President in all matters relating to the Department of Defense.

A system had now evolved where the Secretary of Defense decided what course of action to pursue. This was a complete alteration of the pre-1947 concept where the armed services made the decisions regarding defense acquisition. Now, one man, working with his staff and the services, coordinated all efforts with respect to providing a system to meet the nation's needs.

2. Office of the Secretary of Defense (OSD) Involvement in the Decision-Making Process

Despite the organizational changes in the Department of Defense, prior to the introduction of significant policy changes by former Secretary of Defense, Robert S. McNamara (1961 - 1967), OSD involvement in the system acquisition decision-making process was largely that of loosely monitoring service initiated programs with little input, other than administrative, into actual decision-making.

Charles J. Hitch, in a lecture delivered at the University of California in April 1965, stated, "although

we have no had unification 'in name' for almost 18 years, there was little unification 'in fact' until 1961, except in three areas...."[1] These three areas were: (1) unified commands, (2) joint contingency plans and (3) putting control of the overall level of the defense budget into the hands of the civilian Secretaries by dividing the total defense budget ceiling among the three military departments. This left, to each department, the allocation of its budget among its own functions, units and activities.

The Office of the Secretary of Defense, immersed in its own problems of organization and operation, provided no overall coordination between functions, military and civilian. Each of the four primary assistants to the Secretary of Defense had his own sphere of responsibility and often did not have time to concern himself with the problems of others. These four assistants to the Secretary of Defense were the Director of Defense Research and Engineering, DDR & E; Assistant Secretary of Defense (Comptroller), ASD (COMPT); Assistant Secretary of Defense (Installation and Logistics), ASD(I&L); and the Assistant Secretary of Defense (Systems Analysis), ASD(SA).

"The Director of Defense Research and Engineering is the principal advisor and staff assistant to the Secretary of Defense in the fields of scientific and technical matters; basic and applied research; research, development, test and evaluation of weapons, weapons systems and defense

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1 _____, A Modern Design for Defense Decision, A McNamara-Hitch-Enthoven Anthology (Washington, D. C., Industrial College of the Armed Forces, 1966), p. 51.

material; and design and engineering for suitability, producibility, reliability and maintainability. He supervises all research and engineering activities in the Department of Defense.

The Assistant Secretary of Defense (Comptroller) advises and assists the Secretary of Defense in the performance of the Secretary's programming, budgetary and fiscal functions, and organizational and administrative matters pertaining to these functions. He provides for the design and installation of resource management systems throughout DOD, and collects, analyzes and reports resource management information for the Secretary of Defense and, as required, for the Office of Management and Budget, the Congress, the General Accounting Office, and other agencies outside DOD. He also supervises, directs, and reviews the preparation and execution of the DOD budget, and administers services pertaining to automatic data processing and central data services.

The Assistant Secretary of Defense (Installation and Logistics) is the principal staff assistant to the Secretary of Defense in fields of material requirements; production planning and scheduling; acquisition, inventory management, storage, maintenance, distribution, movement and disposal of material, supplies, tools and equipment; small business matters; transportation, petroleum, and other logistical services; supply cataloging, standardization and quality control; commercial and industrial activities and facilities; military construction, including Reserve Forces facilities; family housing; real estate and real property, including general purpose space; and industrial relations. He is also responsible for assessing the vulnerability of resources to attack damage and for international civil emergency planning.

The Assistant Secretary of Defense (System Analysis) reviews, for the Secretary of Defense, quantitative requirements including forces, weapon systems, equipment, personnel, and nuclear weapons. He assists the Secretary in the initiation, monitoring, guiding, and reviewing of requirements studies and cost-effectiveness studies, and encourages the use of the best analytical methods throughout the Department of Defense. In addition, he conducts or participates in special studies as directed by the Secretary of Defense."[2]

The above "job descriptions" emphasize the prodigious responsibility assigned to each principal assistant

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[2] ______, Department of the Navy RDT&E Management Guide, Part I: System Description (NAVSO P-2457, Rev. 7-72) pp. E2-E5.

to the Secretary of Defense. It is not surprising that each would be involved in his own functions and not initiate an involvement with the problems of others. Prior to the McNamara era it appeared that OSD had the responsibility of monitoring the services in the acquisition of defense systems but was unsure of how to manage this responsibility.

The policy changes of former Secretary of Defense Robert S. McNamara changed but, according to many DOD personnel, did not appreciably improve the situation regarding coordination and cooperation between the services and OSD. Under McNamara the decision-making process became centralized at the OSD level. It lacked the qualities of participative management expected by the services. Secretary McNamara made all major decisions and apparently overmanaged the services to a great extent.[3] The acquisition of major defense systems was still undertaken, but the brunt of a decision often rested on the results of systems analysis. The defense system acquisition process continued to lack the overall coordination between functions [DDR&E, ASD(COMPT), ASD(I&L) and ASD(SA)] necessary for an effective and efficient process.[4]

[3] Jack Raymond, "The McNamara Monarchy," American Defense Policy, Second Edition, (John Hopkins Press, Baltimore, 1968), pp. 406-412.

[4] The reader may acquire further information on this subject by referring to the text of A Modern Design for Defense Decision, op. cit.

In 1969 the Office of the Secretary of Defense came under new management, Melvin Laird, as Secretary of Defense (SECDEF) and David Packard as Deputy Secretary of Defense (DEPSECDEF). Secretary Packard was tasked with the responsibility of improving the defense systems acquisition process while Secretary Laird remained concerned with the diplomatic aspects of the defense department. It was at this time that procedures were put together which had an unequivocal impact on defense system acquisition. The impact of this is discussed later under Section B of this chapter.

3. Service Involvement in the Decision-Making Process

In this section the involvement of the armed services in the systems acquisition decision-making process is discussed. It is the responsibility of the military services to procure defense systems as approved by the Secretary of Defense. This responsibility has always been assigned to the services. Based on this defined responsibility, service involvement in the decision-making process has been and should continue to be one of initiation, marketing and managing their programs.

The services are organized with specific commands assigned exact functions for accomplishing procurement. The Army and the Navy both operate using a Material Command for systems acquisition. Under the Army Materiel Command there are seven commodity commands and one test and evaluation command. The Navy utilizes six system commands under

its Material Command for acquisition purposes. The Air Force assigns the research and systems acquisition function to the Air Force Systems Command and the logistics function to the Air Force Logistics Command. The primary purpose of the services' material acquisition commands is to develop, procure and support defense systems.

Establishment of the Department of Defense in 1947 did not have a significant effect on service decision-making. The services, to a large extent, functioned independently in carrying out their responsibilities in systems acquisition. The services were still tasked with the overall responsibility of system procurement. The monitoring of service procedures and efforts by personnel in the Office of the Secretary of Defense did not impact upon service procedure.

Mr. McNamara, when he assumed the position of Secretary of Defense, felt that he should become intimately involved in all decisions.[5] To achieve this involvement, Mr. McNamara utilized his Systems Analysis office. Since Mr. McNamara's specialty was statistical control his avidity for systems analysis was natural.[6] Some authors infer, as mentioned by McNamara himself,[7] that his system analysis personnel took much of the decision-making responsibility, particularly initiation of programs, away from the services.

[5] Ibid., p. 12.

[6] Raymond, op. cit., p. 408

[7] A Modern Design for Defense Decision, op. cit., p. 16.

Nor did he always follow the services' advice in matters of service interest. This may have been. However, the efforts of the McNamara era did result in some coordinated service endeavors. The Planning, Programming, and Budgeting System (PPBS) was a major McNamara/Hitch innovation which contributed significantly to this coordination.

Defense system acquisition, when Mr. Laird and Mr. Packard arrived in 1969, was overly centralized. One of the effects was low service morale. The new Secretary of Defense and Deputy Secretary of Defense believed in a participatory style of management and gradually restored much of the decision-making responsibility and enthusiasm to the services. This new management style established the beginning of a dramatic reorganization in systems acquisition. The genesis of this reorganization was DOD Directive 5000.1.

B. DOD DIRECTIVE 5000.1

1. Development of the Directive

Prior to the actual issuance of DOD Directive 5000.1, two particularly significant memoranda were issued by DEPSECDEF Packard. These memoranda became the basis for much of the mechanism and policy used in the final directive. The first was the 30 May 1969 Memorandum, Establishment of a Defense Systems Acquisition Review Council (Appendix A), which resulted from Mr. Packard's initial review of system acquisition management in the

Department of Defense. The importance of this memorandum is discussed under Section C of this chapter entitled "The DSARC".

The second memorandum, dated 28 May 1970 Policy Guidance on Major Weapon System Acquisition (Appendix B), was written after a year's study of the acquisition process by Mr. Packard and his staff. This memorandum set the final tone for the issuance of the DOD Directive 5000.1. New policy guidance in this memorandum concerned system acquisition management, conceptual development, full-scale development, production, and contracts. In addition, the decentralization of management in systems acquisition was emphasized.

Management policies addressed in the 28 May 1970 Memorandum were aimed primarily at the utilization and recognition of talented people in the systems acquisition process. Improved procedures for the selection, training, use, and recognition of project managers, in particular, were addressed as means of upgrading acquisition management within the services.

The development policy change brought forth in the 28 May 1970 Memorandum emphasized the use of trade-offs. The effective use of practical cost, schedule, and performance trade-offs, i.e., operating requirements and engineering design trade-offs, was delineated as the most important single factor in the cost of developing and acquiring a new system.

New policy in conceptual development was stressed because wrong decisions made during the conceptual phase of development are particularly difficult to overcome later in the program. Three suggested methods of reducing technical uncertainty in the conceptual phase were risk assessment, system and hardware proofing, and performance, cost and schedule trade-offs.

Full-scale development policy changes concerned themselves with careful planning for risk reduction, milestone planning to demonstrate achievement of objectives, and timely planning for all matters necessary to implement a fully operating system.

The emphasis of production policy changes was directed at the following: (1) completed engineering design, (2) major problem resolution and (3) demonstration of readiness for production by performance testing to the greatest possible extent.

Possibly the most significant change from previous policy noted in the 28 May 1970 Memorandum concerned contracting. Total package procurement which basically shifts program risk to the contractor, had been tested to a limited extent and had failed. New policy dictated that the type of contract be tailored to the risk involved. Cost reimbursement contracts were recommended for advanced and full-scale development and fixed price contracts were recommended for production.

2. Content of the Directive

With two major building blocks in the new Laird-Packard acquisition process established, the DSARC and significant new acquisition policy, the formal document, DOD Directive 5000.1 (Appendix C), was issued. This document restated the policy previously established and went into greater detail in delineating the responsibilities of OSD and the DOD components. Additionally, a more detailed description of program considerations was included. These considerations were (1) a statement of the system need in operational terms and its repeated challenging, (2) consideration of cost parameters to include acquisition and life-cycle costs, (3) logistic support, (4) use of milestones, (5) assessment of technical uncertainty, (6) increased use of test and evaluation, (7) contract form consistent with program characteristics, (8) source selection considerations and (9) use of realistic management information-program control requirements.

C. THE DSARC

Mr. Packard took a major step in reorganizing the DOD approach to system acquisition by establishing the Defense System, Acquisition Review Council (DSARC) through the 30 May 1969 Memorandum. Rather than total utilization of the Development Concept Paper (DCP)

system,[8] a purely formal management and decision-making procedure, a process of systematic adversary management was instituted to complement the DCP system.[9] The charter for the DSARC included with the 30 May 1969 Memorandum, addressed the mission, functions, composition, authority, responsibilities and finally the administration of the DSARC.

Briefly, the mission of the DSARC is to review major system acquisition programs at appropriate and significant milestone decision points to permit coordinated evaluation and deliberation among senior managers and to assure that complete and objective recommendations are given to DEPSECDEF concerning the acquisition of major

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[8] The DCP evolved over a long period of time and the first reference to it, per se, is in the 1967 posture statement of Secretary of Defense McNamara. All OSD references for the actual preparation of DCPs has been informal. Guidelines for its preparation are supplied in service instructions:

Army - Army Reg. 1000-1 30 June 1972
"Basic Policies for System Acquisition"

Navy - SECNAVINST 5000.1, 13 March 1972
"System Acquisition in the Department of the Navy"

Air Force - AFSC Pamphlet 800-3, 14 May 1971
"A Guide for Program Management"

[9] The authors learned through discussions with key OSD and service personnel that the DSARC proceedings are of an adversary nature even though the initial intent of the DSARC was strictly to coordinate service and OSD efforts.

systems. The DSARC recommendations are used by the DEPSECDEF as the basis for his decision regarding program status.

The functions of the DSARC are basically to review and evaluate the status of each program just prior to the following key system decision points: (1) program initiation, (2) transition to full scale development and (3) transition from development to production. The DSARC consists of the DDR&E, the ASD(I&L), the ASD(COMPT), and the ASD(SA). These men are frequently referred to as the DSARC principals. In addition, other OSD personnel, such as the ASD(INTELLIGENCE)and the ASD(TELECOMMUNICATIONS), will be involved when the program comes under their cognizance.

The authority and responsibilities delineated in the DSARC charter include: (1) who chairs DSARC reviews, (2) who chairs additional reviews and how additional reviews are called,(3) what programs are to be included in the DSARC process and (4) what aspects are to be considered at each of the key system decision reviews.

The DSARC provides the means for a coordinated effort to solve the problems of defense system acquisition. During the review, the system project manager brings his analysis of program considerations to the attention of the DSARC principals in a 30 to 45 minute presentation. Examples of these presentations are included as Appendices

D and E. A period of discussion follows in which the DSARC principals ask further questions or present their own arguments for consideration by the other members of the DSARC. During this discussion, the project manager, with detailed knowledge of his program coupled with his awareness of the non-technical aspects, may be drawn upon to clarify the presentation or the information in the DCP.

Attendance at the DSARC review, though somewhat flexible, is generally limited to selected persons. This attendance is controlled by DDR&E.

Finally, after all the information has been presented and analyzed, a recommendation, which will significantly affect the service's program, is submitted by the DSARC to DEPSECDEF.

III. SERVICE PREPARATION FOR DSARC PRESENTATIONS

In the previous chapter, the evolution of the DSARC was discussed. This chapter will discuss the procedures followed by the three services in their preparation for the DSARC.

Appendices D and E are examples of actual DSARC presentations of the Patrol Frigate (PF) Project and the Phalanx Close-In Weapon System(CWIS) Project, less the sensitive portions, and are provided to show the reader the approaches taken by two Navy Project Managers in their DSARC presentations. Appendix E has, included with the presentation, a memorandum, signed by the Deputy Secretary of Defense, which indicates the decision made by the OSD and the rationale behind the decision.

A. BACKGROUND

DSARC reviews are held for major and important Department of Defense system acquisition programs. Criteria for the determination of these programs is available in DOD Directive 5000.1 (Appendix C). Initiation of the DSARC process usually begins by the service informing OSD that it is ready for a DSARC on a particular program; however, a DSARC may be called at OSD's prerogative whenever OSD deems it necessary. An example of this type of DSARC review might be when new threat information is learned which

would make a defense system acquisition program, previously vital, now unnecessary, or when a breech of a previously established threshhold is anticipated.

Prior to the DSARC, the project manager must determine what issues are relevant to his program, and how he will discuss them. These issues will vary from program to program because each program differs in its purpose and objectives. There are, however, certain specified decision considerations which the services must address in some detail. These items are obtained through analysis of DOD Directive 5000.1, by meeting with the DSARC principals' staffs and from formal and informal memoranda.[10] The considerations upon which the project manager should base his presentation are as follows:[11]

NEED/THREAT

ISSUES

FINANCIAL CONSTRAINTS

TECHNOLOGICAL CONSTRAINTS

ALTERNATIVES

TEST AND EVALUATION

PROGRAM RISKS

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[10] At the time of this writing OSD was working on a draft instruction which would explicitly detail which areas of interest the services were to present at each DSARC. Informal liaison with OSD personnel indicates that this draft instruction is still under study.

[11] These items were obtained from OSD personnel who at the time of the interview were involved in analyzing the effectiveness of DSARC presentations.

OPERATIONAL SUITABILITY

PROGRAM MANAGEMENT

PRODUCTION PLAN

The DSARC expects each one of the above topics to be addressed at the level of emphasis determined by the key system decision at hand. For example, if the key decision to be made by OSD is whether to go into production, it is likely that the risks regarding product development may be minor in nature and need not be emphasized. However, the test and evaluation status at this phase in the acquisition process would be of prime importance. How the program manager approaches each of these topics of interest is a function of program status, and what the project manager together with his service has obtained through liaison with OSD. This service liaison with OSD at some level cannot be overemphasized.

One conclusion arrived at by the authors was that the DSARC requires the presentation of sufficient detail to make the correct recommendation but not so much detail that the main DSARC issues are obscured. It must be remembered that OSD utilizes the DSARC for high-level decision-making, and the services must address the issues of importance to the DSARC. As explained to the authors by Vice Admiral Eli Reich, Deputy Assistant Secretary of Defense (Production, Engineering and Material Acquisition),

"Take a pragmatic approach with the DSARC or you are not going to fly."[12]

B. SERVICE PROCEDURES

1. Pre-reviews

The two most significant problems in preparing for a DSARC review are: (1) determining the issues to address and, (2) how to address them in a manner acceptable to the DSARC. Regarding the issues in which the DSARC is interested, the project manager must obtain them through personal contact between the services and OSD, either in the form of memo, phone calls, or actual face-to-face communication. The second problem becomes difficult because the project manager may overlook some of the important aspects of the issues, not because he is unfamiliar with the topics, but rather because he is too closely involved with the program and will tend to address his problems vice the DSARC's. This deep involvement may deter him from the aspects of the issues which are of real importance to the DSARC. Both of these areas of concern are dealt with through pre-DSARC reviews.

The project managers whom the authors were fortunate enough to talk with expressed the belief that the DSARC requires a pre-DSARC review within their own service

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[12] This philosophy was presented during a personal interview with Vice Admiral Eli Reich on 3 November 1973, Washington, D. C.

to ensure that all issues are covered.[13] The pre-review helps to reinforce explanation of the issues obtained from OSD personnel, provides adversary management within the service, solidifies program objectives, and will aid the project manager in presenting the program to the DSARC.

The pre-DSARC review allows senior service personnel, who have been involved in previous DSARCs, to critique the project manager's presentation. These reviews put heavy demands on the project manager's time, but should guarantee better service credibility at the DSARC because reiterations improve the presentation.

All three services use this manner of preparation. An analysis of the respective service instructions indicates much activity involved in pre-DSARC reviews. The Vice Chief of Staff of the Army and the Vice Chief of Naval Material chair their respective review groups. The Air Force conducts two reviews prior to the DSARC review: (1) Air Staff Review chaired by the Deputy Chief of Staff (R & D) and, (2) Joint Secretary of Air Force and Chief of Staff of the Air Force Review.

Because of the involvement of high level service personnel, the pre-DSARC review will aid in identifying

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[13] Some of the project managers with whom discussions were held during the authors' research trip to Washington, D. C., November 1972, were S3A (Deputy), PF (Deputy) and PHALANX CIWS. This pre-review concept is also supported by Rear Admiral Rowland G. Freeman III, Deputy Chief of Naval Material (Procurement and Production) (MAT 02).

issues and, where necessary, will also ensure that emphasis on important technical detail is considered.[14]

2. Checklists

The Army and the Air Force have developed checklists for use by their project managers in preparation for a DSARC review. The Air Force checklist (Appendix F) covers the requirements of DOD Directive 5000.1. The Army checklist (Appendix G) appears to be an expansion of the Air Force checklist and is extremely detailed regarding the technical aspects of the program. Examples of this are electromagnetic compatibility requirements and the description of value engineering provisions. The authors consider both checklists excellent in the technical sense but unbalanced in some areas. These checklists are limited in their scope - they do not address all factors which the authors consider pertinent in the planning of an effective DSARC presentation. The checklists give an excellent picture to the project manager of what he should know about his program but do not adequately prepare him for a DSARC presentation.

The Navy does not use an official checklist because it considers the interface between the Navy Material Command and the project managers together with the pre-DSARC

[14] For further information on pre-DSARC reviews consult:
OPNAVINST 5000.41 dated 15 September 1972
NAVMATNOTE 5000 dated 10 January 1973
Army Regulations 15-14 dated 17 January 1973
Air Force HOI 800-3 (Proposed)

reviews to be sufficient to identify issues in which the DSARC is interested. The point made by the Navy was that the DSARC's interests vary depending upon the program; therefore, the DSARC could not be prepared for by using a set of standard specific technical checklists.[15] Broad guidance may be put into a checklist, but that information is considered available to Navy project managers through the pre-DSARC review.

This concept, followed by the Navy, makes the success of the program depend on the discussions at various review levels to ensure coverage of all the areas of DSARC interest. Although the Air Force and Army checklists tend to get too specific, the lack of a Navy checklist provides their project managers no initial guidance.

The project manager's presentation effectiveness becomes a function of the experience level of the reviewers and, though that aspect is important, without an established set of guidelines, utilization of the reviewer's knowledge is often lost due to personnel transfers.

The authors believe that there should be a base for the project manager to begin preparing his presentation for the DSARC, and that a broad set of written guidelines establish this base. It must be remembered, however, that

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[15] This point was made by Admiral Rowland G. Freeman during a discussion with him during the author's research trip to Washington, D. C. in November 1972.

the existence of checklists do not, in themselves, ensure a good DSARC presentation. The key to an effective presentation is in the coordination between OSD, the services and the project manager.

3. Non-technical Considerations

Available checklists, with the possible exception of a section on program management, are totally oriented toward technical details. However, of primary importance, in the authors' opinion, is that there is more to a DSARC review than presenting the technical details of the program. The non-technical aspects of the presentation must also be considered. This point can be made clear by paraphrasing a comment made to the authors by a high service official, "All DSARCs are different and the project manager must sell his program. He must prove himself capable and then tell the DSARC how the job is to be accomplished."[16]

The project manager best achieves this task by knowing the issues to be addressed and how the views of the members of the DSARC are oriented toward his program. The authors submit that the project manager must be aware of the following items which do not appear in checklists:

a. THE EFFECT ON THE PROGRAM OF THE DSARC PRINCIPALS AND THEIR STAFFS

b. THE USE AND EFFECT OF THE DEVELOPMENT CONCEPT PAPER

[16] This philosophy was expressed by Dr. Peter Waterman from the Office of the Assistant to the Secretary of the Navy for R & D, November 1972.

c. A FIRM FOUNDATION TO ARGUE FOR THE PROGRAM

d. THE PROGRAM IN RELATION TO AN ENTIRE MILITARY CAPABILITY

e. THE BUDGET AND FUNDING PROCESS

f. INDISTINCT EXTERNAL AND INTERNAL FACTORS AFFECTING THE PROGRAM

(1) Visibility and exposure

(2) Tradition, Parochialism, and Vested Interests

(3) Inertia

g. THE UNKNOWN

These items are addressed in detail in Chapter IV.

C. SUMMARY

All services attempt to speak to the issues of interest to the DSARC as taken from DOD Directive 5000.1. One of the questions asked OSD personnel was, "Are the services well prepared for the DSARC presentation?" The answer received from all those interviewed was, "Yes."

A good technical checklist may be of some importance for project managers in their preparation for a DSARC presentation. The Air Force and Army have provided their project managers with such checklists. The authors consider these checklists too technically detailed to properly prepare a project manager for a DSARC presentation. Contrary to the Navy's viewpoint of not needing a checklist however, the authors consider a broad set of written

guidelines covering broad technical requirements and non-technical considerations important, particularly for the inexperienced project manager.

Though the pre-DSARC reviews seem to be necessary and do provide the impetus needed to develop and clarify the issues and technical considerations desired by the DSARC, the project manager's efforts in preparing for a DSARC could only be enhanced by the acceptance and use of a broad set of established guidelines, as proposed in the next two chapters.

IV. CONSIDERATIONS IN THE PREPARATION OF A DSARC PRESENTATION

There are many factors which must be considered by the project manager in his preparation for a DSARC presentation. These factors may be separated into two categories, general background factors, which the authors consider to be non-technical, and specific material, or the technical items discussed in DOD 5000.1.

The background factors to be discussed in this chapter were derived and developed largely through discussions with people involved in the DSARC process such as Mr. David Packard, who established the DSARC, Mr. E. J. Nucci, the executive secretary of the DSARC, Vice Admiral Eli Reich, Deputy Assistant Secretary of Defense (Production Engineering and Material Acquisition), several persons with an interest similar to that of the authors of assisting project managers in preparing for the DSARC, and several project managers who had experienced DSARC reviews or were preparing for them. These background factors as stated in part in Chapter III include:

1. The Project Manager's Approach to the DSARC Presentation

2. The Effect on the Presentation of the DSARC Principals and their Staffs

3. Use and Effect of the Development Concept Paper (DCP)

4. A Firm Foundation to Argue for the Program

5. The Program in Relation to an Entire Military Capability

6. The Budget and Funding Process

7. Indistinct External and Internal Factors Affecting the Program

8. The Unknown

These factors may not be included specifically in the DSARC presentation; however, their impact must be understood and this understanding should provide the project manager with added insight into the preparation of his DSARC presentation.

Following the discussion of background factors, several more specific considerations for DSARC presentations are discussed. These considerations are derived from DOD Directive 5000.1 and include the following:

1. System Need/Program Objectives

2. Performance Parameters

3. Cost Parameters

4. System Alternatives

5. Program Plans

6. Acquisition Strategy

7. Areas of Major Risk

8. Special Logistic Problems

9. Options Available

Careful consideration and evaluation of the background factors and the considerations of DOD Directive 5000.1 will provide a project manager with information for the

preparation of this DSARC presentation. A more detailed discussion of these background factors is given in the following paragraphs.

A. THE PROJECT MANAGER'S APPROACH TO THE DSARC PRESENTATION

The project manager should be the most important single source of information regarding his project. However, with the wealth of information at his disposal, it is possible for the project manager to focus his attention on detail during a DSARC presentation and lose sight of the key system decision and recommendation to be made.

The initial intent of the DSARC, according to former DEPSECDEF Packard, was not to manage programs, but was to "...make sure the improved procedures were in fact being applied to each major project at all stages and to assure that programs were ready to move into production or the next stage of development."[17]

Comparing the considerations of a decision-maker (1) problem recognition and formulation, including the specification of goals, (2) specification of alternative courses of action, (3) identification of key uncertainties, (4) collection of relevant data, (5) estimation of the value of alternative courses of action, and (6) implementation of the alternative chosen[18]--with Mr. Packard's original intent

[17] "Farewell" Report of Former Deputy Secretary of Defense David Packard on Defense Management Problems, 7 August 1972.

[18] Ronald E. Frank and Paul E. Green, Quantitative Methods in Marketing (Englewood Cliffs, N. J., Prentice-Hall, Inc., 1967), p.1.

for the DSARC, it follows that the project manager should address in his presentation the question of how the service has accomplished each of the first five points and how the service intends to accomplish implementation, if approved.

The project manager must provide the DSARC with information regarding his program to show that (1) a requirement exists, (2) the best possible procedures have been utilized to evalute alternative courses of action and (3) implementation has been carefully planned. This will make his presentation more effective in meeting the goals of the DSARC.

B. THE EFFECT ON THE PRESENTATION OF THE DSARC PRINCIPALS AND THEIR STAFFS

1. The DSARC Principals

At each DSARC presentation, the management capabilities of all the DSARC principals are brought together to focus their attention on a program decision and to make the best possible recommendation to DEPSECDEF. The expertise of each of the DSARC principals should be brought into the purview of the decision at hand to allow each to effectively contribute to the DSARC recommendation. At a DSARC presentation, the potential contribution of each of the DSARC principals is often overlooked by the project manager. For example, at the program initiation DSARC, DSARC I, which is research and development oriented and chaired by the DDR and E, system issues which are less development oriented, yet which may become significant later in the acquisition

process, are often overlooked. Additionally, preparation for production contracting may be overlooked or the planning of production options to meet unanticipated budget restrictions may not be discussed.

The project manager should become familiar with the expertise and personalities of each of the DSARC principals, anticipate their interest and involvement in the decision at hand, and present each one with information to enable him to contribute effectively to the decision. Each DSARC recommendation is concerned with the total acquisition of the system being examined, not just the suboptimization of the key system decision at hand.

2. The Principals' Staffs

The staffs of the DSARC principals may affect the final DSARC recommendation in two ways, (1) by their influence on the general attitudes of the DSARC principals and (2) by the direct effect of their analyses.

Since the DSARC principals occupy difficult, time-consuming management positions, they often receive information which is either developed directly by their staffs or else passes through the staffs. This shaping and filtering process and close personal contact over a long period of time can affect, understandably, the attitude of the DSARC principal with respect to the program, though this effect may be less noticeable than that of the direct analysis.

Prior to DSARC presentations, the staffs of the DSARC principals become deeply involved in a detailed

investigation of the program. During these investigations, the staffs develop adversary approaches to key system decisions to be used by the DSARC principals at the DSARC review. This investigation and direct analysis may have a significant effect on the DSARC principals' final recommendation.[19]

The decentralization of defense acquisition management responsibility, emphasized in the Laird-Packard philosophy, attempted to eliminate to the greatest possible extent, interference in program management by OSD except (1) at key system decision points, (2) when critical problems arose in programs, or (3) as directed by SECDEF or DEPSECDEF. This decentralization appears to have allowed the services to isolate themselves from the OSD staffs; the OSD staffs are generally not allowed to "interfere" with the program and the service is required only to communicate with the OSD staffs in conjunction with DSARC reviews.[20] During discussions with project managers and OSD personnel, the author noticed that there appeared to be hostility toward open communication rather than an attitude of harmoniously working toward a common goal.

This lack of open communication acts to the detriment of good service/OSD understanding and often obscures the real issues to be discussed at DSARC reviews. To avoid

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[19] Discussions with Cost Analysis Improvement Group (CAIG), Personnel, Office of ASD(COMPT), 8 November 1972.

[20] "Farewell" Report of Former Deputy Secretary of Defense, op. cit. p. 9.

wasting the time of the services and the DSARC principals and to permit timely DSARC recommendations to DEPSECDEF, the issues must be clearly understood prior to the DSARC review. Informal staff discussions, with a goal of maintaining open communication and understanding, without interference, could do a great deal to overcome unanticipated obstacles. It is important that the project manager utilize the authority vested in him to open the lines of communication or to understand the reasons that his authority is being restricted and to correct those situations.

C. USE AND EFFECT OF THE DEVELOPMENT CONCEPT PAPER (DCP)

The Development Concept Paper (DCP) is a tool used to insure thorough evaluation of a program at service and OSD levels of analysis in that it "...represents a good layout of each program as a whole, and enables the DSARC to see all factors that should be considered before financial resources are heavily committed to it. The DCP serves as a sound basis for deciding whether or not we need the system and for examining the pros and cons of alternative ways of approaching the development."[21] The original intent of the DCP as stated in DOD Directive 5000.1 was to

> ...define program issues, including special logistics problems, program objectives, program plans, performance

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[21] Vice Admiral Vincent P. de Poix, "Concepts for Improving Defense Management" <u>Defense Management Journal</u>, Vol <u>VII</u>, No. 1 (Spring 1971), p. 38.

parameters, areas of major risk, system alternatives and acquisition strategy.

After a key system decision is made, the DCP becomes a form of contract between the service and OSD relating to the future conduct of the program.

There are proponents within OSD and the services who insist that prior to every DSARC, the DCP must be updated, reviewed, and fully coordinated through all DSARC principals. They argue that complete coordination allows all issues to be effectively analyzed.

The Navy has been criticized for requesting (and receiving) DSARC reviews prior to completion and review of a program's DCP. The Navy argues that prior to the DSARC review, resolution of issues is not complete on some programs and the "final contract" cannot be consummated. Further, the Navy contends that a non-finalized DCP provides the DSARC more flexibility regarding its recommendation to DEPSECDEF. At the DSARC review new alternatives can be proposed as a result of the meaningful interchange between the service and the DSARC principals. The changes can be entered in the DCP and significant "coordination" time can be saved. General guidance within OSD now supports this concept.

Both sides of the question have valid arguments. In programs where many alternatives exist and agreement is improbable, the complete coordination of the DCP may not be realistic prior to the DSARC review. The final determination regarding whether to request the DSARC key system

decision review with a complete or incomplete DCP will probably be affected by factors such as decisions by seniors above the project manager in the chain of command and which are not under his control. It is, however, incumbent on him to understand all the reasons for a particular decision, to weigh them carefully, and to insure that his program's best interests are indeed being served.

D. A FIRM FOUNDATION TO ARGUE FOR THE PROGRAM

The basic assumptions and needs on which the program is based may be considered by the project manager as accepted facts after the first key system decision, DSARC I. This belief may be erroneous. The acquisition of a major system is a dynamic process. Factors that may be relevant at one point in time may be irrelevant at another time. There should be DSARC principals or members of their staffs as well as members of the project manager's staff and personnel within the sponsoring service who question basic assumptions throughout the acquisition of a system.

If the project manager is to give an effective DSARC presentation, he must be prepared to cope with "opposition" to his basic assumptions at all times. An example of the project manager's need to be prepared for DSARC opposition occurred during a production decision DSARC for the S3A carrier-based aircraft program. The project manager assumed that aircraft carriers would continue to be utilized by the Navy during the life of the S3A aircraft. The need for and

continued use of aircraft carriers was questioned at this DSARC review. This assumption had not been questioned in pre-DSARC discussions by the OSD Systems Analysis personnel and the project manager's lack of complete justification for the assumption, and thus the ability to settle the issue quickly, caused additional DSARC meetings to be held regarding this fundamental question. Agreement was finally reached and only then was the production decision recommendation pursued further.

The project manager must be able to effectively cope with opposition, whether it is directly related to the DSARC recommendation at hand or not, if he is to give an efficacious DSARC presentation. One method of handling opposition that is not directly related to the decision at hand is to utilize prepared point papers. Such point papers could cover a wide range of topics with current justification and positions clearly outlined and could be utilized to "read into the record" the arguments necessary to justify assumptions.

E. THE PROGRAM IN RELATION TO AN ENTIRE MILITARY CAPABILITY

A conflict of interest arises in the formulation of the DSARC presentation when the project manager attempts to view his project from his advocacy role within the service as well as from the level of the OSD. With the complexities of system acquisition, the OSD level must be viewed as coordinating the acquisition of many systems to provide the

nation with a total defense capability. The service project manager, on the other hand, to adequately perform his job, must be an advocate for a very small element of that entire capability.

> There are too few people in DOD who appreciate the problem of getting a total defense program that makes sense. The military and civilian participants in this process must learn to take a larger view and recognize that the perspective that is appropriate for the project officer is not one that is appropriate for someone who is participating in the development of the total national defense program.[22]

To overcome the conflict, the project manager must generalize, in part, his view. In addition to being a strong advocate for his program, the project manager must consider his program in relation to the entire military capability of the nation. This broader view will allow him to relate more accurately with the goals of the DSARC and to formulate his presentation at its level.

A broader view on the part of the project manager may also benefit the service directly. It should allow the project manager to develop and suggest trade-offs among service programs and service funds. These may benefit the service in the long run. When the broader view on the part of the project manager is generalized to include the analysis

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[22] Alain C. Enthoven, and K. Wayne Smith, "The Planning, Programming, and Budgeting System in the Department of Defense: An Overview from Experience" in R. A. Haveman and J. Margolis, eds., Public Expenditures and Policy Analysis (Chicago, Markham Publishing Company, 1971), p. 493.

of interservice alternatives among programs and funds, it should enhance his service's position in the competitive atmosphere of interservice rivalry at the DSARC level. This improved position will result because the service will be in a position to understand alternatives available to it regarding interservice trade-offs and to utilize those options to its own benefit.

The problem is for the project manager to retain his highly motivated advocacy review and at the same time to broaden his view of how his system fits into the larger national defense scenario. Obviously he can best overcome this conflict by being cognizant of national defense objectives and the part his program plays in meeting those objectives. But even more closely related to his advocacy status, he must be aware of the programs of his service and of other services, how they relate to his program, and what trade-offs are available.

F. THE BUDGET AND FUNDING PROCESS

The project manager must be aware of the pervasiveness and complexity of the budgeting and funding process because this system may have several impacts on his program.[23]

Budget changes may occur which force immediate changes in program plans. To be prepared for potential budget changes, a listing of priorities for budget cuts among subsystems within the program and a means of allocating budget cuts among that priority listing must be developed. Such a budget change contingency plan will give the project manager the necessary information to effectively cope with new alternatives which assume various budget changes if they are considered at a DSARC review. This budget contingency plan should be utilized by the project manager as background/support material for his DSARC presentation.

In addition, the timing of DSARC meetings in relation to the budget cycle may have an impact on program alternatives available. If DSARC reviews are conducted just after Program Objective Memoranda (POM) submission and Program

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[23] The system that includes budget planning within DOD was conceived by Charles J. Hitch and was introduced into DOD in the early 1960's by then Secretary of Defense Robert McNamara with the able assistance of Mr. Hitch. It is called the Planning, Programming and Budgeting System (PPBS) and it provides a multi-faceted system that assists in managing DOD resources. An informative, yet brief, article regarding PPBS was published in the recent past: Rushing, Charles F., Captain, USN, "The Department of the Navy and DOD Planning, Programming and Budgeting System (PPBS)," Armed Forces Comptroller, Vol. 17, No. 3 (Summer 1972). Further detail regarding PPBS may be acquired in the Department of the Navy Programming Manual.

Decision Memoranda (PDM) are issued, each service's budget plan for the following year will be somewhat inflexible and trade-off alternatives may be largely restricted to intra-service trade-offs only.[24] To overcome the inconvenience of such budget inflexibility, long-range planning may be required to optimize the timing of a DSARC review within the budget cycle.

Overall budget trends may also affect acquisition projects. Periods of decreased funding cause austere research and development programs which may severely limit the investigation of alternatives to meet program objectives.

The project manager's program may be affected by the budget and funding process in many ways such as cuts in funding, changes due to program stretchout, the effects of a delay in exercising options to buy or unexpected funding increases. To most capably handle the effects of this process, he must possess a thorough understanding of it.[25] Experience in applications of budgeting and funding would also be

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[24] The previous two references do not address the relationship of the DSARC to the annual PPBS cycle; however, an understanding of the documents mentioned in this paragraph and as presented in those references should indicate the reasons for decreased budget flexibility.

[25] Various schools such as the Navy Management Systems Center, Monterey, California, and the Defense Weapons System Management Center, Fort Bevoir, Virginia, offer courses which provide information regarding the budget/funding process.

highly beneficial and was recommended as a prerequisite for the project manager (WSAM) subspecialty designator.[26]

G. INDISTINCT EXTERNAL AND INTERNAL FACTORS AFFECTING THE PROGRAM

A number of indistinct factors affect a program throughout its development and acquisition. Due to the pervasiveness of these factors, they may be difficult to recognize and deal with. These factors include (1) program visibility and exposure; (2) tradition, parochialism, vested interests; and (3) inertia. All may be important in a DSARC analysis and recommendation.

1. Program Visibility and Exposure

Program visibility may be regarded as the program's susceptibility, due to its importance, to examination by those who may have an impact on it. These individuals may include OSD officials, Congressmen, other high government officials, the media, and the public as well as those servi e officials directly associated with the program. Program exposure refers to the method in which a program is presented for view by those same groups and may include such vehicles as newspaper articles, briefings, congressional testimony, investigative reports and many others.[27]

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[26] This information obtained in discussions with Commander Thomas Solan, USN, Office of the Assistant Director for Subspecialty Management (WSAM Manager), 9 November 1972.

[27] A particularly good example of high program visibility and beneficial exposure regarding the F-15 Aircraft procurement occurred in a recent article in the Wall Street Journal, 12 Feb 1973, p. 3, "McDonnell Douglas's F15 Fighter Appears Headed for Big Air Force Production Run."

High program visibility and derogatory exposure may cause grievous difficulty for a system throughout its acquisition. It is, therefore, incumbent on the project manager that he understand the visibility of his program. It is important that he monitor, analyze, and guide its exposure carefully with constant anticipation of changing attitudes, both in favor of and against his program. If overlooked, this requirement may produce a negative effect on a DSARC presentation and the future of the program.

2. <u>Tradition, Parochialism, Vested Interests</u>

Tradition, the handing down or transfer of beliefs and customs, may affect a program, particularly in its early formulation, by introducing strengths or by introducing weaknesses such as inhibiting new alternatives from being synthesized and analyzed. Tradition may introduce a weakness into a service recommendation to the DSARC as follows. The number of units recommended by the Navy to be procured in a shipbuilding program may be large simply because tradition dictates that large numbers of ships must be maintained. Closer scrutiny of this traditional approach may indicate that fewer and better, rather than more, ships may be cost-effective and benefit the national defense to a greater extent.

Parochialism is a restricted or confined interest. Parochialism exists, for example, when a submariner believes that submarine programs should take precedence over aircraft programs, not because they are better, but because he has a

narrowness of interest. Parochialism may affect the program as it proceeds through its initial conception, when basic objectives are being established, or through the pre-DSARC process when interservice attitudes alter the project manager's presentation. Alternatives may be eliminated or basic objectives may be altered by parochial interests.

Vested interests are those interests held by persons for their own gain. For example, a person prominent in the development of an alternative subsystem may promote the use of that subsystem, even to the detriment of the major system, because his prestige would be increased by use of his subsystem. Often change prompted by vested interests leads to modifications to the existing system which (1) require other changes in the system, (2) increase the performance capabilities of the system which are not necessary to meet objectives, or (3) require contract changes which increase costs and change the schedule. All these effects may be harmful to the service effort.

The effects of tradition, parochialism, and vested interests on a program may be similar. Any weaknesses, disagreements, or alternatives introduced during intraservice decision-making by either tradition, parochialism, or vested interests may force the project manager to accept compromise in order to reach agreement among decision-makers. Compromise may eliminate alternatives that would be more effective in reaching program objectives and adding

effectively to the defense posture of the nation. A clear understanding of program objectives, clear goals which the project manager forcefully uses to guide program decision-making, will aid him in overcoming the harmful effects of tradition, parochialism and vested interests on his DSARC presentation.

The previous discussion of tradition, parochialism and vested interests was intended to focus on situations where the three factors would be used within the service as "crutches" to provide interservice personnel with arguments in behalf of their own interests. The intent was not wholly to indicate that the effects of these three factors were all necessarily deleterious to an acquisition program. They may all play beneficial roles if used properly. Tradition may indicate that obviously cost-effective alternatives do not fit into existing Navy organizational systems; changes would be required which would not benefit the Navy as a whole. Parochialism may force a clearer statement of program objectives to overcome its effects. Vested interests may provide substantially increased cost-effectiveness, within budget constraints, even though some change may be required. The beneficial effects of these three factors must also be considered.

3. Inertia

Inertia may work to the detriment of satisfactory program accomplishment. It may affect a program from the service level or the OSD level.

At the service level, when program momentum is established, it may be difficult to stop, even when required for effective management of the program. This forward inertia, tends to force the program onward even when realistic planning dictates that the program be stopped or that uncompleted milestones be completed before progress is continued.

At the OSD level, problems discovered in a project prior to or during DSARC reviews may cause further progress to be delayed. Decreased confidence in the project may affect the timely continuance of further work. Investigation by the DSARC principals' staffs may continue or even increase, DSARC reviews may be difficult to reschedule, and the program may not be allowed to continue temporarily. This type of delay, even though only temporary, imparts a different form of inertia on the program, that of a body at rest, which may be particulary difficult to overcome, especially in a bureaucratic environment.

In the first case, that of forward inertia, when uncompleted milestones are finished but other progress has continued, problems may be discovered which call for system changes and large quantities of rework in portions of the system where progress had been continued. In the latter case, a program temporarily halted, total costs may rise significantly due to the normal rate of inflation or due to necessary contract changes. Both forms of inertia may have bad effects on a program.

A clear understanding of milestone planning and its effective application should provide the project manager, the service, and the OSD with a guide to overcome inertia as follows: "In planning a program--to structure the program so that progressive commitments are made only when justified by the remaining level of program risk. In managing a program--to assure that the premises on which program commitments were originally planned have been validated, or proven, before additional commitments are made."[28]

H. THE UNKNOWN

The unknown will be encountered in all programs and the project manager must develop a method to deal with it. One important way to prepare for the unknown is to build slack into the program schedule.[29] With outside pressure for rapid program completion, this may be difficult for the project manager to accomplish, but it is a necessity. Schedule slippage will almost certainly occur if there are no provisions for slack.

However, if slack is provided for and is advertised as such in the program schedule, it may be cut from the program by higher authority or used for purposes other than intended. Contractors may subconsciously understand that development or production schedules may slip. Test and evaluation

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[28] ..., Introduction to Military Program Management, Logistics Logistics Management Institute, Washington, D. C. LMI Task 69-28, March 1971, pp. 31-32.

[29] Ibid., pp. 34, 73.

personnel may provide for testing which cannot be accomplished without utilizing scheduled slack. It is part of a project manager's responsibility to schedule slack in his program while cautiously guarding its presence.

A project manager may also plan for the unknown by developing schedule trade-offs when unknown schedule problems are not anticipated. These trade-offs are often called "what if" or contingency plans. Intimate acquaintance with cost, performance, and schedule plans should allow the project manager to plan trade-offs that are not obvious to all program decision-makers due to their lack of familiarity with the program.

I. CONSIDERATIONS OF DOD DIRECTIVE 5000.1

As is often the case in staff-prepared documents, the requirements of the originator are broad in scope, and often the drafters of the directive will attempt to meet the originator's desires by encompassing the entire spectrum of the topic. DOD Directive 5000.1 is such a document. It attempts to provide policy guidance and to address all issues of importance in a general manner. Interpretation is left, however, to the reader and misunderstanding often results.

While the basic understanding of DOD Directive 5000.1 is important for all project managers, the primary purpose of this subsection is to distill, for the project manager,

the fundamental considerations contained in the Directive that are essential for the project manager to understand prior to his presentation to the DSARC. Tailoring the DSARC presentation to the issues at hand requires judicious preparation and involves interstaff coordination between program sponsor, program coordinator, project manager, and OSD so that the interplay between groups will bring out the issues of importance.[30] The considerations to be discussed in the following paragraphs should be addressed to the degree required by the key system decision being made. For example, if the recommendation to be made by the DSARC regards program initiation, the presentation must address the threat in more detail than need be done after the program is approved and production is being considered, because proceeding with the program at this decision point will be based on whether the program meets a threat to the nation's security. At other key system decision points, the threat area must also be addressed, but only to the extent of what has changed and what has occurred in the analysis of the threat that will affect the program. It is emphasized that each key system decision will address the following points stipulated in the DOD Directive but at different levels of emphasis.

[30] Further information regarding the interrelationships of the Program Sponsor, the Program Coordinator and the Project Manager in the development of the need/objectives concepts are discussed in Appendix NB of the <u>Department of the Navy Programming Manual</u>.

1. System Need/Program Objectives

The DSARC is concerned with recommending to the Secretary of Defense viable defense programs. One of the basic criteria it utilizes to make this recommendation is whether the program is necessary in terms of what it is intended to accomplish. This accomplishment factor is usually correlated to the potential enemy threat. The level of threat analysis discussed at the DSARC review will ultimately depend upon the key system decision being made, but more important may be the question of why the DSARC concerns itself with the threat. The answer is twofold. One, the Secretary of Defense determines policy and therefore desires to ensure that defense programs that counter potential threats are coordinated to conform to that policy; and two, this requirement stops the program manager from adding performance characteristics superfluous to countering the threat. The project manager knows that he must substantiate every facet of his program to the DSARC. This makes the analysis of each facet important to the service to (1) ensure that the threat is adequately countered, (2) ensure that a capability is cost-effective and (3) ensure overall management in optimizing the program's contribution to the national defense.

The discussion of need and objectives is not necessarily presented by the project manager at the DSARC review. Often this aspect of the presentation is presented by the OPNAV program coordinator for the Navy or his counterpart

in the other services from their operational requirements or, force structure groups, or other DOD components. For example, in a past DSARC review regarding the F5E International Fighter Aircraft both Defense Intelligence Agency (DIA) and International Security Affairs (ISA) personnel gave ten-minute presentations on need, funds, and commitments prior to the Air Force project manager giving his presentation.

Though the project manager may not be directly responsible for generating and discussing the need and objectives, he still shares responsibility to continually examine and validate the need/requirement as it impacts his project management decisions.[31]

2. Performance Parameters

The project manager, in establishing performance parameters, must realize that he does not possess an open-ended budget whereby he can procure whatever the technicians can deliver. There must be a departure from the former procedure of establishing "requirements" that are at the limit of achievable technology.[32] The project manager should keep performance at the point where the threat is adequately and effectively countered and should build into the system room

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[31] The need/objective presentation made at the DSARC review is normally classified. Because of this fact, an example of this part of the DSARC is not included in the appendices.

[32] Paraphrased from a speech given by Admiral Elmo Zumwalt, Chief of Naval Operations at a Secretary of Defense Management Conference at AIRLIE HOUSE, 29-30 September 1972.

for future growth only when it is considered cost effective. A good example of this future thinking occurred in the POLARIS weapon system. In the design of this weapon system the immediate strategic objective was met, but plans for the future indicated that growth capabilities should be built in. The conversion from POLARIS to the improved POSEIDON missle did not entail an extreme redesign process or high new construction costs because the initial design had provided for the planned future growth.

The DSARC will examine the management expertise of the program presented. If the project manager can demonstrate that the performance parameters selected, and being used for design of the system, have been compared to the basic objectives necessary to counter the threat, and can provide justification that these parameters have been expanded, only because of the need for growth potential and not "gold plating," then this fact should emphasize the positive capabilities of the project's management.

3. Cost Parameters

The program cost estimates discussed at a DSARC review may be considered from several aspects; portion of program life considered, items actually included in cost estimates, potential changes in costs utilizing alternative systems, reliability of estimates, escalation factors, or degree of risk. Generally, the costs addressed at a DSARC review should include, as a minimum, each of the categories detailed below.

a. Acquisition Cost

The acquisition cost is the cost to develop and produce the system. The items included in the acquisition cost estimate should be clearly understood within the service and by the DSARC. Often significant portions of this cost, for example spare parts support, are not reflected in the estimate to portray a more favorable situation than actually exists.[33]

During the early stages of development, acquisition cost may be particularly difficult to estimate. During early development, only parametric cost estimates may be available. During later development, detailed engineering estimates and production cost data may be developed to further refine original estimates.

The basis for parametric cost estimating is that costs of a defense system are related in an approximate but quantifiable way to their physical and performance characteristics through past experience and data with similar items. Advantages of parametric estimates include: (1) they may be calculated quickly; (2) they may be inexpensive; (3) they should realistically reflect typical program problems; and (4) they may be utilized early in the program. Disadvantages may include: (1) they require an extensive and correct cost and performance data base (not one based on mismanaged

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[33] Report to the Congress, Acquisition of Major Weapons Systems, by the Comptroller General of the United States, March 18, 1971, pp. 72-73 and March 29, 1972 (Draft copy) pp. 101.

programs; (2) relationships between cost, physical characteristics, and performance must continue to exist and to be valid in their extrapolation; and (3) extrapolations involving state-of-the-art developments may be erroneous.[34]

Detailed engineering cost estimates also have advantages and disadvantages. The primary advantage is that they may be more accurate than parametric estimates due to their significant, in-depth analysis. The disadvantages are: (1) they may be costly due to the large man-hour requirements for experienced estimators; (2) they take significant time to develop; (3) they may not reflect potential problems or changes in the program; and (4) they may only be available late in the development stages of the program.

Differences between actual acquisition costs incurred, their original estimates, and, most important, expected costs to completion should be anticipated and explained at DSARC reviews.

b. Life Cycle Cost

Life cycle cost is defined as the total cost for the development, acquisition, operation, and logistic support of a system over a defined life span. All support costs should be considered in life cycle costs and discounting, inflation and "trade-in" or residual value concepts should be applied.

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[34]Donald W. Srull, "Parametric Cost Estimating Aids DOD in Systems Acquisition Decision," Defense Management Journal, Vol. 8, No. 1, (April 1972), pp. 2-5.

Life cycle cost estimates are important to the project manager since they may be used in cost-effectiveness studies related to his program, in requirement studies where more than one system is being considered, as a part of his DCP, and in efforts such as concept formulation and contract definition (CF/CD).[35]

c. 'Design to' Cost[36]

Though 'design to' costing has been used for some time in commercial product development, its application to military systems development has been fairly recent. The objective of 'design to' costing is to develop and produce a system within a predetermined cost constraint; that is, to use cost as a design parameter.

The basic requirements for a 'design to' cost target system are first, to have a good original estimate of the cost to produce and, secondly, to have a feedback system capable of initiating corrective action when the 'design to' threshold may be breeched. Though the benefits of 'design to' costing include increased visibility of the cost to produce and better identification of future value engineering change proposal opportunities resulting from cost feedback, the primary benefit is that it provides a system to track cost-to-produce to allow initiation of

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[35] ..., Department of the Navy Programming Manual, Appendix J.

[36] Vice Admiral Eli T. Reich, "The Challenge of Cost-to-Produce," Defense Management Journal, Vol 8, No. 1 (April 1972), pp. 6-10.

appropriate corrective design action early and in and throughout the development cycle.

The application of 'design to' costing as (1) a tool of system acquisition and (2) to provide better program management should be stressed and the benefits it has provided should be delineated, if applicable, at the DSARC review.

4. System Alternatives

"In choosing from among alternatives, the best alternative will be that which contributes most effectively and efficiently to the attainment of a desired goal."[37] A point to be emphasized in the presentation of alternatives to the DSARC is that the program has flexibility. Both the management as well as the technical capabilities of the system are being assessed by the DSARC. The project manager must demonstrate firm control of the program. Alternatives developed must consider future service environments in which systems will operate and the presentation must indicate a plan for continual updating.

There will be times when the stage of acquisition will dictate the number of alternatives available. For some programs the only acceptable alternative may be the one that cancels the program. Whatever the situation, the important concept to emphasize is the capability to circumvent

[37] Harold Koontz and Cyril O'Donnell, Principles of Management: An Analysis of Managerial Functions (New York, McGraw-Hill Book Company, 1968), p. 223.

uncertainty and to have a clear path toward program objectives. If a program has progressed to a position where the only alternative is to cancel, then this situation must be made known to the DSARC so that they are cognizant of the circumstances surrounding their recommendation.

The number of screws to be designed into the Patrol Frigate is an example of a system alternative discussed in Appendix E, pages 143 through 144.

5. Program Plans

a. The Milestone Approach

The recommendation made to the Secretary of Defense on whether to continue with a program is partly based on the program manager's ability to show that managerial control of the program is sound. This is best demonstrated by establishing firm goals and then meeting them. This concept is called milestoning.[38] Established goals must relate to key, observable, and measurable events and, most important, must be able to indicate accomplishment of the key event. When the milestone is accomplished, the risk associated with the program has been reduced by an observable amount and the chances of successful completion of later milestones within the assigned thresholds of cost, schedule and performance have been improved.

Milestoning will also provide the program manager with control over concurrency. Concurrency, in the

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[38] Introduction to Military Program Management, op. cit., pp. 28-33.

strict sense, is the overlapping of major phases of a program; e.g., starting the production phase prior to finishing the development phase. There are situations where some type of concurrency is necessary or desirable, such as in the procurement of long lead-time items. Milestoning, because of its finite measurement capability, should provide the program manager with a check point with which he may derive information necessary to make proper decisions.

Demonstrable accomplishments are the most effective indication of program progress. For the project manager milestones divide the total procurement into smaller portions for which individual plans may be developed; emphasizing the accomplishment of milestones will furnish the DSARC with the information it needs to make its recommendation regarding the future of the program.

b. Test and Evaluation

The Test and Evaluation Plan is one of the items that is used to provide the explicit measurement necessary for demonstrating accomplishment of milestones.

There are two types of test and evaluation, one type associated with the development of the system and the second associated with the operation of the system. Test and evaluation must be drafted into the program when development of the system is undertaken and must be continuous throughout the program. Test and evaluation should provide (1) information regarding development, i.e., development

testing useful in resolving problems to meet development objectives; (2) information for acquisition milestone decisions, the best information available on completion of milestones required for a key system decision, and (3) information for effective system operational test and evaluation efforts.[39]

Test and Evaluation has always been an important facet of systems acquisition but increased emphasis on this essential operation has placed it in a position such that the program manager must be able to discuss test and evaluation explicitly at each DSARC review.[40] The importance of addressing test and evaluation is emphasized by the requirement for the project manager to present, prior to the initial DSARC, a copy of his overall test and evaluation plan to the Deputy DDR&E (Test and Evaluation) for analysis.

Appendix D, pages 128 and 129 provides an example of an outline of a test and evaluation plan. Appendix E also provides a good discussion of this topic.

6. Acquisition Strategy

Acquisition strategy, as viewed by the authors, is that strategy related to the procurement or the "buying" of the system. The document which relates directly to the detailed "buying" strategy of a system is the Advanced Procurement Plan (APP). This Plan may include the overall

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[39] Department of the Navy R D T & E Management Guide, op. cit., p. 7-8.

[40] See Report of the Blue Ribbon Defense Panel of July 1970.

system or may be made-up of several subsystem plans. The continued updating and use of the APP as a management tool should overcome many of the difficulties of coordinating an effective acquisition strategy.

Topics related to acquisition strategy, as they apply to the DSARC review, follow.

a. Source Selection Evaluation[41]

The complexities of source selection dictate that evaluation criteria be formulated early and continue to be developed over a long period of time.

The DSARC does not normally become involved directly in source selection although the DEPSECDEF or SECDEF may be. However, for a more complete understanding of the program, the DSARC is interested in information comparing the programs of unsuccessful bidders with the winning proposal, particularly comparisons of cost, schedule and performance characteristics or other pertinent information.[42]

b. Contract Type

Though it is not intended that the project manager become a contracting officer, the greater his knowledge of contracting, the more analytical and knowledgeable can

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[41] An informative article regarding source selection evaluation was contained in the Defense Industry Bulletin dated August 1969 and was entitled "Contractor Proposal Evaluation Process Defined by AMC." The article was written by Victor Garvis.

[42] Memorandum for Secretaries of the Military Departments dated 26 June 1970 from DDR & E (Subject: DSARC Reviews Containing Source Selection Information Briefing).

be his approach to contracting at the DSARC review. The project manager should be cognizant of and understand all contract types and their applicability or lack of applicability to his program.

c. Maintaining Competition

Maintaining competition during development and prior to production can provide significant benefits for a program. This method of decreasing risk during development and cost of production does, however, present problems. In many programs parallel development costs are prohibitive because of the size and scope of the development; in others sole source production contracts may be required. A thorough analysis of trade-offs between maintaining competition and cost limitations must be accomplished at all key system decision points to ensure maximum efficiency within budget constraints.

d. Management Information

The procurement of management information may not appear to be a significant part of the acquisition strategy, but in the past great problems have arisen regarding it. Excessive requirements were forced upon contractors, worthless information was reported and funds were wasted.

Because of previous difficulty, the acquisition of management has received much attention and the Cost/Schedule Control System Criteria (C/SCSC) were developed to help rectify this problem. C/SCSC aids the project manager

in acquiring management information from which uniform cost, schedule and performance information for meaningful application to decision-making at the service and OSD levels may be extracted.[43]

7. Areas of Major Risk

The DSARC is vitally interested in the areas of risk which endanger program completion or may cause breeches of cost, schedule and/or performance thresholds. To satisfy this interest, the DSARC must be (1) appraised of the alternatives and trade-offs available to reduce risk and (2) presented with an evaluation of the degree of risk and the probability of overcoming the risks successfully. The tools the project manager should use in the evaluation of risk for final presentation to the DSARC are risk management, risk assessment, and risk analysis.[44]

Risk management is the generation of alternative courses of action for reducing risk and should be considered when system alternatives are presented. Risk assessment is a comprehensive, and frequently structured, process for estimating the risk associated with a particular alternative course of action. It is often handled by systems analysis

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[43] DOD Directive 7000.2 (Subject: Performance Measurement for Selected Acquisitions) delineates policy regarding the procurement of management information.

[44] Further information including broad coverage of risk handling may be obtained in the Final Report of the USAF Academy Risk Analysis Study Team, Colorado, 1 August 1971.

personnel. It provides information regarding the degree of confidence in a specific alternative. Risk analysis is the effort of coordinating risk assessment and risk management in an iterative cycle to develop the most feasible, least risk alternatives for program accomplishment.

There is much subjectivity involved in risk assessment. However, the primary benefit of risk assessment is that the problem is attacked in an orderly, consistent manner. This orderly method of solving the risk problem can produce positive results, an increase in the project manager's confidence in preparing for a DSARC and more importantly, it can produce increased confidence by the DSARC in the project manager's management of his project.

A good example of a discussion of risk is contained in Appendix E, page 146.

8. <u>Special Logistic Problems</u>

Integrated logistic support is a complex disciplin which can provide substantial benefits for the program or can create grave problems for the project manager. Proper planning to insure adequate logistic support without committing resources too early, i.e., logistic support in phase with program accomplishments, must be the goal within each project.

Integrated logistic support planning concepts must be developed early in the program to ensure that all logistic elements required to support the operational system are

properly planned, developed and coordinated with the system design.

The level of ILS planning and development activity during the acquisition process must be consistent with the needs of each phase of the acquisition process. For example, during advanced development broad ILS planning must be accomplished while engineering development ILS plans must be further refined in such areas as maintenance planning, logistic support personnel, technical logistic data and information, support equipment, spares and repair parts, facilities and contract maintenance.[45] As the acquisition process proceeds toward production, plans become more detailed and address specific milestones and problem areas.

The project manager must be able to discuss each aspect of the ILS plan; however, detail should be tempered in favor of the integration of the ILS plan into overall program plans. Appendix D, pages 134 through 135 provides an outline for such a discussion. Appendix E also addresses this concept on page 146.

9. Options Available

The DSARC presentation should clearly enumerate the options available to the DSARC and DEPSECDEF. It is at this point that the project manager has an opportunity to express

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[45] These are the elements of integrated logistic support as suggested in notes prepared for the UCLA Short Course, Integrated Logistic Support, by Dr. Melvin B. Kline, September 1970.

his services' analysis regarding what recommendation the DSARC should make. As the person closest to the program, the project manager's recommendation should be influential. However, the project manager's recommendation cannot be parochial. The options presented by him should normally include: (1) progress as recommended toward program completion, (2) choose from one of several options for more cautious progress toward program completion, such as one of several proposed partial production buys rather than the full buy, or (3) cancel the program. The DSARC presentation should indicate which option the service considers to be the best alternative.

Appendix D, pages 104 through 141, provides an explicit example of the options presented in the PHALANX CIWS DSARC presentation.

V. PROPOSED GUIDE FOR PREPARATION OF THE DSARC PRESENTATION

In previous chapters, the consideration for a DSARC presentation and the existing methods of preparation were discussed. To improve upon existing check-lists for DSARC preparation, a guide has been prepared to assist in preparation for key system decision DSARC presentations. For purposes of cross reference, the topics in the guide are in the same order in which they occurred in Chapter IV.

It is not the intent of the proposed guide to provide a "cook-book" method for the preparation of the presentation. Rather, the intent is to provide a general and flexible guide which considers all factors pertinent to the presentation with emphasis on the non-technical factors. The project manager must provide his emphasis, as necessary, on various portions of the proposed guide depending upon the key system decision to be made or special issues to be addressed as suggested by the DSARC principals or his service.

PROPOSED GUIDE FOR PREPARATION OF THE DSARC PRESENTATION

A. APPROACH TO THE DSARC PRESENTATION

The project manager's approach to the DSARC presentation must include information related to the following:

1. problem recognition and formulation, including specification of goals and thresholds;

2. specification of alternative courses of action;

3. identification of key uncertainties;

4. means of collection of relevant data;

5. estimation of the value of alternative courses of action;

6. description of the means of implementation of the alternative chosen.

B. THE DSARC PRINCIPALS AND THEIR STAFFS

The effect of the DSARC principals and their staffs should be considered and every effort should be made to understand their motives, interests, and capabilities and to provide them meaningful information on which they may make effective recommendations.

1. Are the interests, personalities, and expertise of each of the DSARC principals thoroughly understood?

2. Is the area of management interest of each of the DSARC principals to be addressed in the DSARC presentation?

3. Have open communications been maintained with the OSD staffs to insure that the real issues are clearly understood prior to the DSARC presentation? Have specific issues to be addressed at this presentation been promulgated by the principals' staffs?

4. What specific disagreements between the service and the principals or their staffs are known; who are the persons involved and how will the disagreements be settled?

C. THE DEVELOPMENT CONCEPT PAPER

The Development Concept Paper (DCP) plays an important part in the DSARC presentation although its intended use may vary.

1. Should the DCP be completed by the service, reviewed, and coordinated by the DSARC principals prior to the DSARC?

2. Will the attitudes of the DSARC principals be adversely affected by lack of a coordinated DCP?

3. If the completed DCP will not be reviewed by the DSARC principals, what is the specific reason? Is this reason really in the best interests of the program?

D. A FIRM FOUNDATION TO ARGUE FOR THE PROGRAM

Several assumptions may have been made regarding the key system decision at hand. All the assumptions do not carry the same importance, but several could interfere with an effective DSARC presentation. A firm foundation to argue for the program must be available.

1. What are the assumptions on which the presentation is based?

2. If the assumptions or other items not directly related to the decision at hand are questioned, how will the questions be answered satisfactorily when the project manager does not have the answers in his mind; point papers, assistance of the program coordinator, answered at a later time?

E. RELATIONSHIP TO ENTIRE MILITARY CAPABILITY

Each program must be viewed as an element contributing to the entire military capability of the nation.

1. Is the project manager aware of broad service and DOD objectives regarding the military capability of the nation and how his program contributes to those objectives?

2. What other programs are trying to meet basically the same objectives?

3. Are intraservice or interservice trade-offs available to enhance the nation's military capability and to also benefit the program?

F. THE BUDGET AND FUNDING PROCESS

The budget and funding process pervades the acquisition of defense systems. Not only the handling of program funds, but the broader aspects of the budgeting process may effect the program.

1. Does the project manager understand the broader aspects of the budget and funding process as well as his own management of funds?

2. What are the effects of the budget preparation sequence on the program schedule and DSARC presentation?

3. Has a "budget change plan" been prepared to establish a priority of subsystems to accept budget changes and provide an allocation of budget changes of the priority listing of sybsystem?

G. INDISTINCT INTERNAL AND EXTERNAL FACTORS

Several somewhat indistinct internal and external factors, of which the project manager should be aware, may affect the program.

1. How visible is the program in relation to other programs? Is this likely to change in the future?

2. Can those who are interested in the program aid or adversely affect the program because of its visibility?

3. To what type of exposure has the program been subjected? Must increased or decreased control of exposure be exercised?

4. Did tradition play a part in early program decision? Will tradition affect the program at the OSD level when interservice competition is involved?

5. Did parochialism play a part in early program decisions or does it influence present decisions? Does this weaken the program by forcing compromise?

6. Have vested interests introduced excess performance and excess cost into the program? Can the excesses be removed to improve the program?

7. Have tradition, parochialism or vested interests decreased the alternatives available to the program?

8. Has good milestone planning been accomplished to overcome the effects of inertia?

9. Is forward inertia causing the program to continue to progress when good management practice dictates that milestones be completed before progress continued?

H. THE UNKNOWN

The unknown will be encountered during the program. Methods of dealing with it are necessary; however, they may have low visibility.

1. Is slack available within the schedule to compensate for unknown problems? What is being done to insure that planned slack is not used when not necessary or unrealistically cut from the program?

2. How will funding be planned to compensate for the unknown? Who knows and who should know exactly what the program budget is?

3. What alternatives/trade-offs are available throughout the program when technical difficulties arise?

I. CONSIDERATIONS OF DOD DIRECTIVE 5000.1

1. <u>System Need/Program Objectives</u>

The system need and program objectives will be discussed specifically at DSARC I, but the DSARC's that follow will also reevaluate these.

a. Who has defined the threat and is it agreed upon within various intelligence gathering agencies and the services?

b. Do the program objectives meet the current threat? Are there further considerations such as future development potential of the system?

c. May the threat change in the foreseeable future and what changes might be made in the program objectives to make them more adequately meet the threat?

2. <u>Performance Parameters</u>

Performance parameters may require change during system development, but change frequently adds cost and lengthens schedule to completion.

a. Were performance parameters established based on the threat?

b. Is all available technology being utilized? Are we pushing the state-of-the-art? What is the technical risk?

c. What performance envelope is acceptable to insure that program objectives are attained? What are maximum and minimum performance parameters and what are present expectations?

d. Have performance parameters and costs been considered together to provide cost-effective performance?

3. <u>Cost Parameters</u>

A clear understanding of exactly what costs are being addressed will assist the DSARC in making effective recommendations. Often cost information is incomplete and optimization of combinations of systems does not occur; the total national defense is jeopardized.

a. Is the estimate of acquisition cost a point estimate or a range of cost and what is the confidence in the estimate?

b. Who made the estimate; how was it made (parametric cost estimate, engineering estimate) and against what was it checked?

c. What is the estimate of life-cycle cost? How was it estimated and by whom?

d. Has a 'design to' cost been established? How do present estimates compare with the required cost target?

4. System Alternatives

System alternatives may be developed for many reasons. They may reduce technical uncertainty, help to provide a lower cost system, and provide program flexibility to overcome budget changes.

a. What system and subsystem alternatives are presently available?

b. What is the cost-effectiveness of the major alternatives and how do they compare with the program objectives?

c. Why are additional alternatives still being considered?

d. Do we need to generate new alternatives?

5. Program Plans

In addition to the strategy involved in buying the system, the use of milestones in the program plan and the test and evaluation plan are important facets of the overall program plan.

a. What are the major milestones of the program? Why have they been established?

b. Will concurrency exist, be reduced or be eliminated in the program with the present milestones?

c. What milestones are to be accomplished prior to the next DSARC?

d. Has a test and evaluation plan been prepared and submitted to the Deputy DDR & E(T & E)?

e. What testing milestones must be accomplished before the next DSARC?

f. To what extent will the "fly before buy" concept be realized in this program?

6. Acquisition Strategy

The advanced planning of the acquisition strategy is particularly important since long periods of time may be required to execute various portions of the plan; e.g., source selection evaluation.

a. Has the Advanced Procurement Plan (APP) been completed and approved by the service for the key system decision under consideration?

b. Have the criteria for source selection evaluation been developed?

c. What differences were noted between the preferred proposal and the unsuccessful bidders' proposal?

d. Why was the contract type selected? What advantages does it offer for the government and the contractor?

e. How will future contracts be structured?

f. How is competition being maintained in this procurement? What are the trade-offs between maintaining competition and increased development costs/decreased production costs?

g. Are the principles of the Cost/Schedule Control System Criteria (DOD Directive 7000.2) applicable to this procurement? If so, how are they being applied?

7. Areas of Major Risk

The major risks noted in the acquisition of the system may be best managed by assessment, risk management, and risk analysis. The DSARC is vitally interested in the areas of major risk and how they are being overcome.

a. What are the areas of major risk in the program? How were they determined? What are the probabilities of overcoming them?

b. How have alternatives been structured to overcome risk?

8. Special Logistic Problems

Integrated logistic support (ILS) has become a sophisticated discipline for application to system procurement. The DSARC is particularly interested in logistic elements which remain problems and which require special emphasis.

a. Have all the elements of logistics been included in the ILS plan? If not, how are those not included being handled?

b. What logistic problems exist and what is the plan to correct the problems?

9. Options Available

The DSARC must be appraised of specifically what options the service considers as presently available for the DEPSECDEF and which the service recommends. These options will normally include:

a. Continue the program via the alternative plan recommended by the service;

b. Continue the program via alternative plans such as: cut/increase quantities; delay schedule; change performance parameters;

c. Do not continue with further work, but gather further information to support continuance of the program;

d. Discontinue the program.

VI. CONCLUSION

This thesis provides the project manager with a set of guidelines which can be used to better prepare his presentation for the DSARC review.

Analysis of the current procedures used by the services led to a conclusion which supports the concept of the pre-DSARC review. This pre-DSARC review is considered very important to the development and refinement of the issues of concern to the DSARC. A beneficial effect of this pre-review is that in addition to the presentation of issues called out in DOD 5000.1 being refined, the less tangible aspects to be considered are also emphasized. This pre-review effort enables the project manager to focus his presentation on those items of primary interest to the DSARC.

Checklists, as developed by the Army and the Air Force are judged as an excellent listing of many of the tangible or technical criteria of which the project manager should be aware in managing his program. However, it is felt that these checklists do not provide the project manager with broad enough guidance to completely prepare for a DSARC presentation.

The considerations discussed in Chapter IV are what the authors compiled from their analysis of interviews with DOD personnel, study of service procedures and documentation,

and the study of checklists. A firm knowledge of these considerations is believed to be necessary for the project manager as a base for his DSARC presentation. Together with the pre-DSARC review, these considerations will enable the project manager to effectively, impressively, and knowledgeably address the DSARC.

In Chapter V the authors have summarized their considerations for the project manager and presented them in synoptic form for ease of use by the project manager. The authors believe that because of the broad nature of their proposed guideline information, emphasizing the non-technical aspects of the DSARC presentation, it may most effectively be promulgated informally as a general guide to be used by project managers of all services in conjunction with other tools in the preparation of a DSARC presentation.

APPENDIX A

THE DEPUTY SECRETARY OF DEFENSE
Washington, D. C. 20301

30 May 1969

(Copy)

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
DIRECTOR, DEFENSE RESEARCH AND ENGINEERING
ASSISTANT SECRETARY OF DEFENSE (COMPTROLLER)
ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS)
ASSISTANT SECRETARY OF DEFENSE (SYSTEMS ANALYSIS)

SUBJECT: Establishment of a Defense Systems Acquisition Review Council

I have been reviewing for some time current practices within the Department of Defense for the acquisition of major systems. My review has highlighted the importance of our organization and practices for accomplishing this management job. The primary responsibility for the acquisition and management of our major systems must rest with the individual Services. Within each Service, this responsibility is focused in the Project Manager. Recognizing the Service responsibility, I am, at the same time, most anxious of insuring, before we approve transitioning through the critical milestones of the acquisition of a major system, that all facets of the acquisition process are properly considered.

Toward this end, I am establishing a Defense Systems Acquisition Review Council (DSARC) within the Office, Secretary of Defense, to advise me of the status and readiness of each major system to proceed to the next phase of effort in its life cycle. The Council will serve to complement the Development Concept Paper (DCP) system, which continues as a formal DOD management and decision-making system for the acquisition of major systems. The Council will evaluate the status of each candidate system at three basic milestone points: First, when the sponsoring Service desires to initiate Contract Definition (or equivalent effort); second, when it is desired to go from Contract Definition to full scale development; and third, when it is desired to transition from development to production for Service deployment.

The functions of the Council are separate from and do not encompass the management reviews of major systems which I have previously requested and which are being conducted by

DDR&E with assistance from ASD(I&L) and ASD(Compt). These reviews are focused on the management of the system whereas the DSARC reviews will cover all issues, program thresholds and other matters normally treated in DCP's. Also, the management reviews will normally be held only once on each major system; whereas the DSARC reviews, which are based on program milestones, will be normally conducted three or more times during the acquisition cycle of a particular system.

The membership of the Council will include DDR&E, ASD(I&L), ASD(C), and ASD(SA). For the first two milestone reviews, that is, prior to entry into contract definition and prior to entry into full scale development, the Council will be chaired by the DDR&E. For the third review, related to the transition from development to production, the Council will be chaired by the ASD(I&L).

I am initially defining major systems, which will be subject to Council reviews, to include (1) those for which Development Concept Papers are required; and (2) those specifically designated by me for review and evaluation. A tentative charter for the Council is attached as an enclosure. I desire that the DDR&E and ASD(I&L), within the next 30 days jointly prepare the necessary procedures and take the necessary administrative actions to implement the Council charter.

I believe the Council operation will result in improved management and will augment the decision-making process within the Department of Defense. I cannot over-emphasi e the need for complete interface throughout the Departmen in the system acquisition process.

/s/ DAVID PACKARD

Enclosure
a/s

Charter

Defense Systems Acquisition Review Council

1. Purpose

This charter prescribes the mission, functions, composition, authority and responsibility, and administration of the Defense Systems Acquisition Review Council (DSARC).

2. Mission

The mission of the DSARC is to review major and important Department of Defense system acquisition programs at appropriate milestone points in their life cycle. These reviews are intended to permit coordinated evaluation and deliberation among senior managers, based on the most complete presentation of information available to assure that advice given the Secretary of Defense is as complete and objective as possible prior to a decision to proceed to the next step of the system's life cycle. The DSARC operation and evaluations will serve to complement the DCP system which remains as a formal DOD management and decision-making system concerning the acquisition process of major defense systems.

3. Functions

a. The DSARC will review and evaluate the status of each appropriate system acquisition program at three basic milestone points:

First: When initiation of Contract Definition (or equivalent effort) is proposed;

Second: When transition from the Contract Definition phase to full-scale development is proposed; and

Third: When transition from the development phase into production for Service deployment is proposed.

b. The first review will support the basic DCP in that it will provide a forum for discussion and possible resolution of the various viewpoints of the participating principals, including the Secretary of the Military Service sponsoring the program. The later reviews will serve a function of validating the readiness of a system to proceed to the next stage, i.e., normally full-scale development or production.

4. <u>Composition</u>

The DSARC will consist of the DDR&E, the ASD(I&L), the ASD(Comptroller) and the ASD(SA).

5. <u>Authority and Responsibilities</u>

a. For consideration of entry into Contract Definition (Contract Definition Phase) and entry into full-scale development (the full-scale development phase), the DSARC will be chaired by the DDR&E.

b. For the transition from development to production (the production phase), the DSARC will be chaired by the ASD(I&L).

c. For additional reviews, the DSARC will be chaired by DDR&E or the ASD(I&L) as appropriate, depending on whether the action under consideration is concerned with movement within the full-scale development phase or into or within the production phase.

d. Reviews at points other than program transition points may be requested by a DSARC member by memorandum to the appropriate chairman.

e. Review of a program at any point in its life cycle may be directed by the Secretary of Defense or the Deputy Secretary of Defense.

f. Reviews will be limited to major and important programs. These are (1) those for which Development Concept Papers are required; and (2) those specifically designated for review by the Secretary of Defense, the Deputy Secretary of Defense or the appropriate DSARC chairman.

g. Aspects to be considered by the DSARC include, but are not limited to, the following:

(1) <u>For items proposed for Contract Definition</u>

(a) Justification of military need;

(b) Validity of operational concept and objectives;

(c) Relative capability compared with present/anticipated and with capabilities of other systems;

(d) Technical feasibility;

(e) Validity of cost estimates and analysis of cost risks involved;

(f) Validity of proposed scheduling and consideration of alternatives thereto;

(g) Validity of proposed procurement methodology, including type of contractor structure, kind of contract, timing of Government production commitment, means of assuring competition; and

(h) Validity of program manager plans, controls and organization.

(2) <u>For items proposed for transition from Contract Definition into full-scale development</u>:

(a) Continued validity of program objectives and validity of changes thereto since completion of concept formulation;

(b) Confidence in achieving current program objectives;

(c) Analysis of current risks;

(d) Technical feasibility, risks associated therewith and analysis thereof;

(e) Adequacy of integrated logistics support planning;

(f) Validity of cost estimates, including analysis of cost differences between competing Contract Definition contractor and Government estimates;

(g) Options associated with cost trade-offs and analysis thereof;

(h) Adequate consideration of contract incentives and inducement for competition; and

(i) Validity of contractor proposals.

(3) <u>For systems proposed for initial production</u>:

(a) Feasibility of production, including evaluation of milestone achievements, test results and production line producibility;

(b) Technical feasibility, including specification requirements;

(c) Review and evaluate overall requirement;

(d) Current validity of cost estimates;

(e) Need, as appropriate, for concurrent development and production as well as validity of recommended time phasing of production/deployment aspects;

(f) Adequacy of integrated logistic support planning;

(g) The existence of adequate project management controls;

(h) Adequate planning for Government-furnished equipment and facilities; and

(i) Adequate planning as to proprietary rights items.

h. The Chairman may invite other staff members, such as the ASD(M&RA) and the ASD(ISA) to participate in the reviews when the reviews have significant relevance to their responsibilities.

i. The Chairman shall advise the Deputy Secretary of Defense of the findings and recommendations of the specific review and concurrently a copy of the findings and recommendations will be forwarded to the appropriate Service Secretary.

6. Administration

The DSARC may establish necessary Working Groups to assist the Council members in their reviews.

APPENDIX B

THE DEPUTY SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

[illegible] 28 1970

MEMORANDUM FOR Secretaries of the Military Departments
Director of Defense Research & Engineering
Assistant Secretaries of Defense
The General Counsel
Assistants to the Secretary of Defense
Directors of Defense Agencies

SUBJECT: Policy Guidance on Major Weapon System Acquisition

We have been considering within the Department, for over a year, ways by which we can improve acquisition programs for major weapon systems. Some steps have been taken which I believe are in the right direction (reference my July 31, 1969 memorandum), and it is now appropriate to move ahead in a concerted effort to firmly establish additional new policies and to implement them.

The prime objective of the new policy guidance is to enable the Services to improve their management of programs. Improvement in the execution of these programs will be made to the extent the Services are willing and able to improve their management practices. The Services have the responsibility to get the job done. It is imperative that they do the job better in the future than it has been done in the past.

It is the responsibility of the OSD to approve the policies which the Services are to follow, to evaluate the performance of the Services in implementing the approved policies and to make decisions on proceeding into the next phase in each major acquisition program.

The purpose of this memorandum is to issue broad policy guidance which is to be translated into appropriate action by all Services and Agencies in new major weapon system acquisitions.

Management

Management in the Services will be improved only to the extent that capable people with the right kind of experience and training are designated to manage these major programs -- in fact all programs. In order to be effective, program managers must be given adequate authority to make decisions on major questions relating to the program both in the conceptual development stage and in the full-scale development stage. If capable people are going to be willing to undertake these important program management assignments, ways must be found to give them some incentive to do so. Program managers must be given more recognition toward career advancement in all of the Services, and good managers must be rewarded just as good operational people are rewarded.

If our people are to develop the experience necessary for program management and are to utilize their experience, they must be assigned to a given program long enough to be effective.

The overall structure of the program management function in all Services needs to be considered. Changes must be made to minimize the numerous layers of authority between the program manager and the Service Secretary.

The entire management problem needs to be addressed under these simple guidelines: put more capable people into program management, give them the responsibility and the authority and keep them ther long enough to get the job done right.

Development

The cost of developing and acquiring new weapon systems is more dependent upon making practical trade-offs between the stated operating requirements and engineering design than upon any other factor. This must be the key consideration at every step in development from the conceptual stage until the new weapon goes into the force.

The program schedule (structure) is another very key consideration. It must make sense. It must allow time for accomplishing important task objectives without unnecessary overlapping or concurrency. The ideal schedule is sequential with enough slack time for resolution of those problems which inevitably arise in any development program.

Conceptual Development

It is crucial that the right decisions be made during the conceptual stage. If wrong decisions are made during this period the problems that are generated cannot easily be overcome later in the program.

Any new program will contain some risk that the technology involved cannot, within reasonable time and cost constraints, be converted into practical engineering design which meets the desired operating requirements. There are three ways in which this technical risk can be minimized:

1. Risk Assessment. The first is to make a careful assessment of the technical problems involved and a judgment as to how much effort is likely to be necessary in finding a solution that is practical. A careful look at the consequence of failure, even of "low risk" program elements, is also critical.

2. System and Hardware Proofing. The second and only sure way to minimize the technical risk is to do enough actual engineering design and component testing in the conceptual development stage to demonstrate that the technical risks have been eliminated or reduced to a reasonable level. Component or complete system prototyping, or backup development, are examples of this.

3. Trade-offs (risk avoidance). Since program risk and cost are dependent on practical trade-offs between stated operating requirements and engineering design, trade-offs must be considered not only at the beginning of the program but continually throughout the development stage.

Proposals for OSD approval of development programs shall include a description of how the Service or Agency intends to manage the program to include appropriate attention to (1) Risk Assessment; (2) System and Hardware Proofing; (3) Tradeoffs. When a DCP is prepared, it shall reflect these in the management plan.

Small development projects which do not require specific OSD approval shall also be structured to reflect these considerations.

All new programs will be kept in the conceptual development stages until the responsible Service secretary and the OSD can be assured that the program is actually in the proper shape to proceed into full-scale development.

Full-Scale Development

Authorization to proceed into full-scale development will be given by OSD based upon a DCP and the recommendation of the DSARC. In making this recommendation, the DSARC shall consider in particular whether adequate risk reduction has been accomplished.

Even though risk has been adequately addressed during the conceptual development stages, full-scale development will uncover technical and engineering problems that need to be solved. Procedures shall be established in the development program by which these problems will be continually addressed in view of possible trade-offs with stated operating requirements, cost, and operational readiness date.

Furthermore, it is essential to have assurance that those problems encountered during the earlier development stages have in fact been solved. This requires that milestones be established to demonstrate achievement of objectives at appropriate points in the development program. These milestones shall include such things as completion of appropriate stages in the overall system design and testing of critical items of hardware, e.g., subsystems and components.

Consideration must be given in development to all matters necessary in a full operating system. This will include such things as maintenance, logistic support, training, etc. However, where these matters are dependent on the final production design, as much of this work as possible should be delayed until the production stage. In general, RFPs for the development stage should be carefully reviewed to eliminate demands for reports, documentation and work tasks which are not absolutely necessary for the efficient accomplishment of the actual development work. These considerations and demands must be limited to those which directly contribute to the design of the system itself.

Production

The most important consideration before moving into full-scale production on a new weapon system is to have assurance that the engineering design is completed, that all major problems have been resolved, and this has been demonstrated to the extent practical by actual performance testing.

At the DSARC review when the decision is made as to whether to proceed into full production, I want the responsible Service to certify that the following actions have been taken:

1. All of the milestones which demonstrate the achievement of a practical engineering design have been met.

2. All important engineering problems encountered during the development have been resolved with appropriate trade-offs with stated operating requirements so that the production, maintenance and operating costs are optimized.

The start up of production must be scheduled to minimize financial commitments until it has been demonstrated that all major development problems have been resolved. In most cases production engineering and production tooling are necessary to demonstrate that the engineering has been satisfactorily accomplished. It may also be necessary to develop and demonstrate new production processes, methods and procedures. Thus, some limited expenditure on production may have to overlap development.

Contracts

In all our contracting, the type of contract must be tailored to the risks involved. Cost plus incentive contracts are preferred for both advanced development and full scale development contracts for major systems. When the assessment of technical risk permits, such contracts should include provisions for competitive fixed price subcontracts for subsystems, components and materials. In many cases this will enable a major portion of the program to benefit from competition. When risks have been reduced to the extent that realistic pricing can take place fixed-price type contracts should be used. But the contracting officer should have the flexibility to consider the technical capability of the contractor and other factors in selection of contract type. When fixed-price type contracts are used for development programs, the contractor's financial ability to absorb losses that might be incurred must be a factor in making the award.

It is, of course, desirable to award a fixed-price contract in a competitive environment. It has been proven to be difficult or impossible to achieve effective competition in a fixed-price-contract for production for a major weapon system before full-scale development has been undertaken. Consideration should therefore be given to the use of a negotiated fixed-price contract after the development has progressed to the point that the production design can be realistically specified. To the extent possible, a contract negotiated under these circumstances should encourage competition for subsystems, components and materials. In this way a substantial part of the cost can be established in a competitive environment.

The use of letter contracts should be minimized. Change orders should not be authorized until they have been contractually priced, or until contractual ceilings have been established.

This guidance is provided to the Services with the understanding that it is to be implemented within the established DCP and DSARC policies. Other reports and reviews are to be kept to a minimum, but the lines of communication between OSD offices and Service components must be kept open to insure actual programs are being implemented under this guidance.

To the extent that the above guidance conflicts with existing DoD Directives and Instructions, the policies stated herein will govern. Since these policies should be applied immediately, I would appreciate your distributing this memorandum to key personnel, including all program managers, involved in the acquisition of major weapon systems.

I want the appropriate regulations of OSD and the Services and Agencies to be changed or cancelled to reflect these policies. I have asked the DDR&E to take the leadership in accomplishing this and have suggested 1 September 1970 as the date for recommending changes to me.

David Packard

July 13, 1971

NUMBER 5000.1

DDR&E

Department of Defense Directive

SUBJECT: Acquisition of Major Defense Systems

I. PURPOSE

This Directive establishes policy for major defense system acquisition in the Military Departments and Defense Agencies (referred to as DoD Components).

II. APPLICATION

This Directive applies to major programs, so designated by the Secretary of Defense/Deputy Secretary of Defense (referred to as SecDef). This designation shall consider (1) dollar value (programs which have an estimated RDT&E cost in excess of 50 million dollars, or an estimated Production cost in excess of 200 million dollars); (2) national urgency; (3) recommendations by DoD Component Heads or Office of Secretary of Defense (OSD) officials. In addition, the management principles in this Directive are applicable to all programs.

III. POLICY

A. Mode of Operation - Successful development, production and deployment of major defense systems are primarily dependent upon competent people, rational priorities and clearly defined responsibilities. Responsibility and authority for the acquisition of major defense systems shall be decentralized to the maximum practicable extent consistent with the urgency and importance of each program. The development and production of a major defense system shall be managed by a single individual (program manager) who shall have a charter which provides sufficient authority to accomplish recognized program objectives.

Layers of authority between the program manager and his Component Head shall be minimum. For programs involving two or more Components, the Component having dominant interest shall designate the program manager, and his charter shall be approved by the cognizant official within OSD. The assignment and tenure of program managers shall be a matter of concern to DoD Component Heads and shall reflect career incentives designed to attract, retain and reward competent personnel.

1. The DoD Components are responsible for identifying needs and defining, developing and producing systems to satisfy those needs. Component Heads are also responsible for contractor source selection unless otherwise specified by the SecDef on a specific program.

2. The OSD is responsible for (a) establishing acquisition policy, (b) assuring that major defense system programs are pursued in response to valid needs and (c) evaluating policy implementation on each approved program.

3. The OSD and DoD Components are responsible for program monitoring, but will place minimum demands for formal reporting on the program manager. Nonrecurring needs for information will be kept to a minimum and handled informally.

4. The SecDef will make the decisions which initiate program commitments or increase those commitments. He may redirect a program because of an actual or threatened breach of a program threshold stated in an approved Development Concept Paper (DCP). The DCP and the Defense Systems Acquisition Review Council (DSARC) will support the SecDef decision-making. These decisions will be reflected in the next submission of the Program Objective Memorandum (POM) by the DoD Component.

Conduct of Program - Because every program is different, successful program conduct requires that sound judgment be applied in using the management principles of this Directive. Underlying specific defense system developments is the need for a strong and usable technology base. This base will be maintained by conducting research and advanced technology effort independent of specific defense systems development. Advanced technology effort includes prototyping, preferably using small, efficient design teams and a minimum amount of documentation. The objective is to obtain significant advances in technology at minimum cost.

1. Program Initiation

   a. Early conceptual effort is normally conducted at the discretion of the DoD Component until such time as the DoD Component

determines that a major defense system program should be pursued. It is crucial that the right decisions be made during this conceptual effort; wrong decisions create problems not easily overcome later in the program. Therefore, each DoD Component will designate a single individual, such as the Assistant Secretary for R&D, to be responsible for conceptual efforts on new major programs.

b. The considerations which support the determination of the need for a system program, together with a plan for that program, will be documented in the DCP. The DCP will define program issues, including special logistics problems, program objectives, program plans, performance parameters, areas of major risk, system alternatives and acquisition strategy. The DCP will be prepared by the DoD Component, following an agreement between OSD and that Component on a DCP outline. The Director, Defense Research and Engineering (DDR&E)(or the Assistant Secretary of Defense (Telecommunications) for his programs) has the basic responsibility for coordination of inputs for the DCP and its submittal to the DSARC for consideration and to the SecDef for subsequent decision. If approved, the program will be conducted within the DCP thresholds.

2. Full-Scale Development. When the DoD Component is sufficiently confident that program worth and readiness warrant commitment of resources to full-scale development, it will request a SecDef decision to proceed. At that time, the DSARC will normally review program progress and suitability to enter this phase and will forward its recommendations to the SecDef for final decision. Such review will confirm (a) the need for the selected defense system in consideration of threat, system alternatives, special logistics needs, estimates of development costs, preliminary estimates of life cycle costs and potential benefits in context with overall DoD strategy and fiscal guidance; (b) that development risks have been identified and solutions are in hand; and (c) realism of the plan for full-scale development.

3. Production/Deployment. When the DoD Component is sufficiently confident that engineering is complete and that commitment of substantial resources to production and deployment is warranted, it will request a SecDef decision to proceed. At that time, the DSARC will again review program progress and suitability to enter substantial production/deployment and forward its recommendations to the SecDef for final decision. Such review will confirm (a) the need for producing the defense system in consideration of threat, estimated acquisition and ownership costs and potential benefits in context with overall DoD

strategy and fiscal guidance; (b) that a practical engineering design, with adequate consideration of production and logistics problems is complete; (c) that all previously identified technical uncertainties have been resolved and that operational suitability has been determined by test and evaluation; and (d) the realism of the plan for the remainder of the program. Some production funding for long lead material or effort may be required prior to the production decision. In such cases, the SecDef will decide whether a DSARC review and revised DCP are required. In any event, full production go-ahead will be authorized by approval of the DCP.

Program Considerations

1. System need shall be clearly stated in operational terms, with appropriate limits, and shall be challenged throughout the acquisition process. Statements of need/performance requirements shall be matched where possible with existing technology. Wherever feasible, operational needs shall be satisfied through use of existing military or commercial hardware. When need can be satisfied only through new development, the equivalent needs of the other DoD Components shall be considered to guard against unnecessary proliferation.

2. Cost parameters shall be established which consider the cost of acquisition and ownership; discrete cost elements (e.g., unit production cost, operating and support cost) shall be translated into "design to" requirements. System development shall be continuously evaluated against these requirements with the same rigor as that applied to technical requirements. Practical tradeoffs shall be made between system capability, cost and schedule. Traceability of estimates and costing factors, including those for economic escalation, shall be maintained.

3. Logistic support shall also be considered as a principal design parameter with the magnitude, scope and level of this effort in keeping with the program phase. Early development effort will consider only those parameters that are truly necessary to basic defense system design, e.g., those logistic problems that have significant impact on system readiness, capability or cost. Premature introduction of detailed operational support considerations is to be avoided.

4. Programs shall be structured and resources allocated to ensure that the demonstration of actual achievement of program objectives is the pacing function. Meaningful relationships between need, urgency,

risk and worth shall be thereby established. Schedules shall be subject to trade-off as much as any other program constraint. Schedules and funding profiles shall be structured to accommodate unforeseen problems and permit task accomplishment without unnecessary overlapping or concurrency.

5. Technical uncertainty shall be continually assessed. Progressive commitments of resources which incur program risk will be made only when confidence in program outcome is sufficiently high to warrant going ahead. Models, mock-ups and system hardware will be used to the greatest possible extent to increase confidence level.

6. Test and evaluation shall commence as early as possible. A determination of operational suitability, including logistic support requirements, will be made prior to large-scale production commitments, making use of the most realistic test environment possible and the best representation of the future operational system available. The results of this operational testing will be evaluated and presented to the DSARC at the time of the production decision.

7. Contract type shall be consistent with all program characteristics including risk. It is not possible to determine the precise production cost of a new complex defense system before it is developed; therefore, such systems will not be procured using the total package procurement concept or production options that are contractually priced in the development contract. Cost type prime and subcontracts are preferred where substantial development effort is involved. Letter contracts shall be minimized. When risk is reduced to the extent that realistic pricing can occur, fixed-price type contracts should be issued. Changes shall be limited to those that are necessary or offer significant benefit to the DoD. Where change orders are necessary, they shall be contractually priced or subject to an established ceiling before authorization, except in patently impractical cases.

8. The source selection decision shall take into account the contractor's capability to develop a necessary defense system on a timely and cost-effective basis. The DoD Component shall have the option of deciding whether or not the contract will be completely negotiated before a program decision is made. Solicitation documents shall require contractor identification of uncertainties and specific proposals for their resolution. Solicitation and evaluation of proposals should be planned to minimize contractor expense. Proposals for cost-type or incentive contracts may be penalized during evaluation to the degree that the proposed cost is unrealistically low.

9. Management information/program control requirements shall provide information which is essential to effective management control. Such information should be generated from data actually utilized by contractor operating personnel and provided in summarized form for successively higher level management and monitoring requirements. A single, realistic work breakdown structure (WBS) shall be developed for each program to provide a consistent framework for (a) planning and assignment of responsibilities, (b) control and reporting of progress, and (c) establishing a data base for estimating the future cost of defense systems. Contractor management information/program control systems, and reports emanating therefrom, shall be utilized to the maximum extent practicable. Government imposed changes to contractor systems shall consist of only those necessary to satisfy established DoD-wide standards. Documentation shall be generated in the minimum amount to satisfy necessary and specific management needs.

V. IMPLEMENTATION

1. Each DoD Component will implement this Directive within 90 days and forward two (2) copies of each implementing document to the SecDef.

2. The number of implementing documents will be minimized and necessary procedural guidance consolidated to the greatest extent possible. Selected subjects to be covered by DoD Directives/Instructions or joint Service/Agency documents in support of this Directive are listed in Enclosure 1. Each DoD Component will forward the joint Service/Agency documents for which it is responsible to the SecDef for approval prior to issuance.

David Packard
Deputy Secretary of Defense

Enclosure
Related Policy

RELATED POLICY

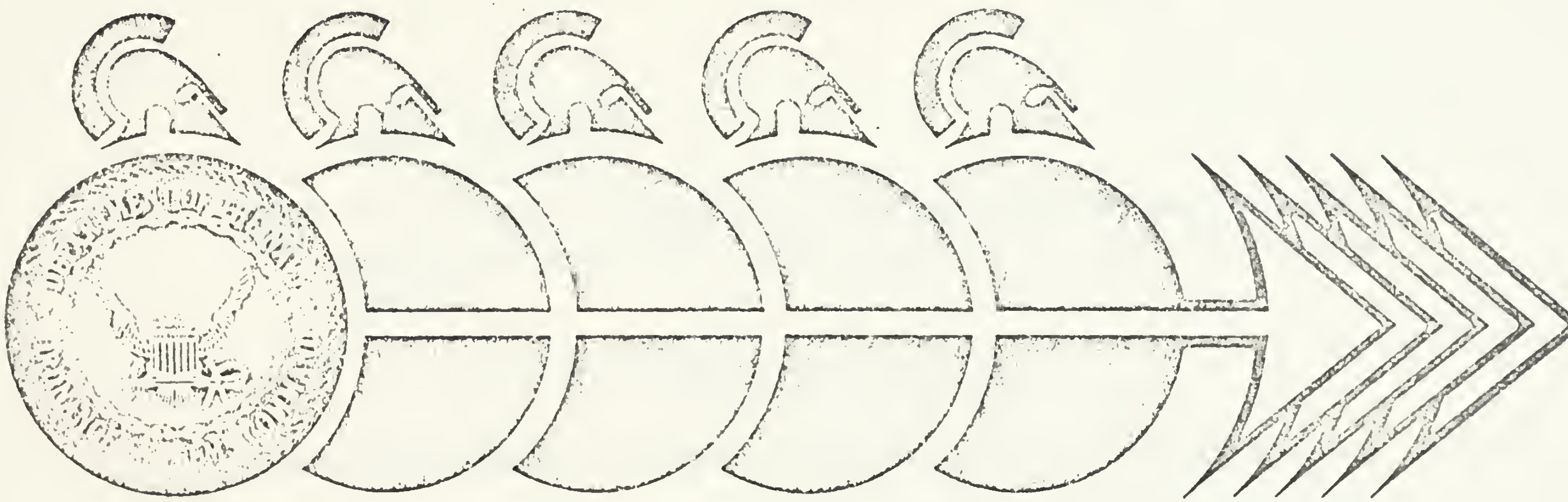
Responsibility for the following policy documents is assigned to the Cognizant Office indicated. In each case, the Cognizant Office shall (a) generate the policy, or (b) delegate authority to a lead DoD Component for preparation and subsequent issue of a joint Service/Agency regulation, agreement or guide after approval by OSD.

Policy Subject	Cognizant Office	Responsible DoD Component
The DoD Technology Base	DDR&E	
The DCP and the DSARC	DDR&E	
Defense System Engineering	DDR&E	Air Force
Proposal Evaluation and Source Selection	ASD(I&L)/ DDR&E	
Cost Analysis	ASD(SA)	
Acquisition of Data	ASD(I&L)	
Cost/Schedule Control Systems	ASD(C)	Air Force
Test and Evaluation	DDR&E	Navy
Priorities and Allocations	ASD(I&L)	
Manufacturing Technology	ASD(I&L)	
Quality Assurance	ASD(I&L)	
Logistic Support	ASD(I&L)	
Standardization	ASD(I&L)	
Value Engineering	ASD(I&L)	

APPENDIX D

PHALANX

CLOSE IN WEAPON SYSTEM



PREPARED FOR DSARC DECISION ON DCP # 88 (U)

NAVAL ORDNANCE SYSTEMS COMMAND
DEPARTMENT OF THE NAVY
WASHINGTON, D.C.

POINTS TO BE MADE

*(U) PHALANX CIWS - AN ESSENTIALLY CONTINUOUS ALERT, AUTOMATIC, FAST REACTING, ALL WEATHER, INNER-ZONE DEFENSE AGAINST THE ANTI-SHIP MISSILES.

*(U) 23 MONTHS INTO ENGINEERING DEVELOPMENT.

*(U) BEING PURSUED ON ORDERLY BASIS WITH STEP BY STEP PROOF TESTING.

*(U) EXPECT TO BE READY FOR TRANSITION TO QUANTITY PRODUCTION ABOUT A YEAR FROM NOW.

POINTS TO BE MADE

✲ (U) NAVY SEEKS APPROVAL OF DCP #88 AND DECISION ON OPTION FOR PROGRAM CONTINUATION.

✲ (U) 3 OPTIONS ARE OFFERED - 1a, 1b AND 2.

✲ (U) NAVY RECOMMENDS OPTION 1a WHICH WOULD AUTHORIZE PROCUREMENT NOW OF 6 TO 9 OPERATIONAL SUITABILITY MODELS (OSM), USE OF DEPLETED URANIUM MUNITIONS IN THIS PROGRAM AND CARRYING FUNDS FOR 35 UNITS IN FY 74 AND 80 UNITS IN FY 75.

✲ (U) BOTH OPTIONS 1a AND 1b PLAN FOR SUBSEQUENT DSARC (MILESTONE III) APPROVAL BEFORE PROCEEDING TO QUANTITY PRODUCTION.

MANAGEMENT ISSUE

DECISION CONCERNING TRANSITION TO PILOT LINE PROCUREMENT, MILESTONES AND THRESHOLDS.

OPTION 1a

CONTINUE PROGRAM WITH 2 ENGINEERING PROTOTYPE SYSTEMS, PROCURE 6 TO 9 OPERATIONAL SUITABILITY MODELS, AUTHORIZE USE OF DEPLETED URANIUM AMMUNITION AND CARRYING IN PLANNING FUNDS FOR 35 UNITS IN FY-74 AND 80 UNITS IN FY-75.

OPTION 1b

CONTINUE PROGRAM WITH 2 ENGINEERING PROTOTYPE UNITS AND WITHOUT 6 TO 9 OPERATIONAL SUITABILITY MODELS.

OPTION 2

TERMINATE CURRENT ENGINEERING DEVELOPMENT EFFORT. CONSIDER REDIRECTION OF PROGRAM EFFORT.

POINTS TO BE MADE

* (U) SYSTEM FEATURES SEARCH & TRACK RADAR, 6 BARREL 20 MM GUN WITH HIGH FIRING RATE:

  50 ROUNDS/SEC
  ABOUT 300 ROUNDS/TARGET
  .75 P_k PRIOR TO 100 YD INNER BOUNDARY

* (U) OVERALL SYSTEM IS 15'5" HIGH, WEIGHS ABOUT 10,000 LBS AND HAS FOUNDATION FOOTPRINT OF 58 FT^2

PHALANX CLOSE-IN WEAPON SYSTEM

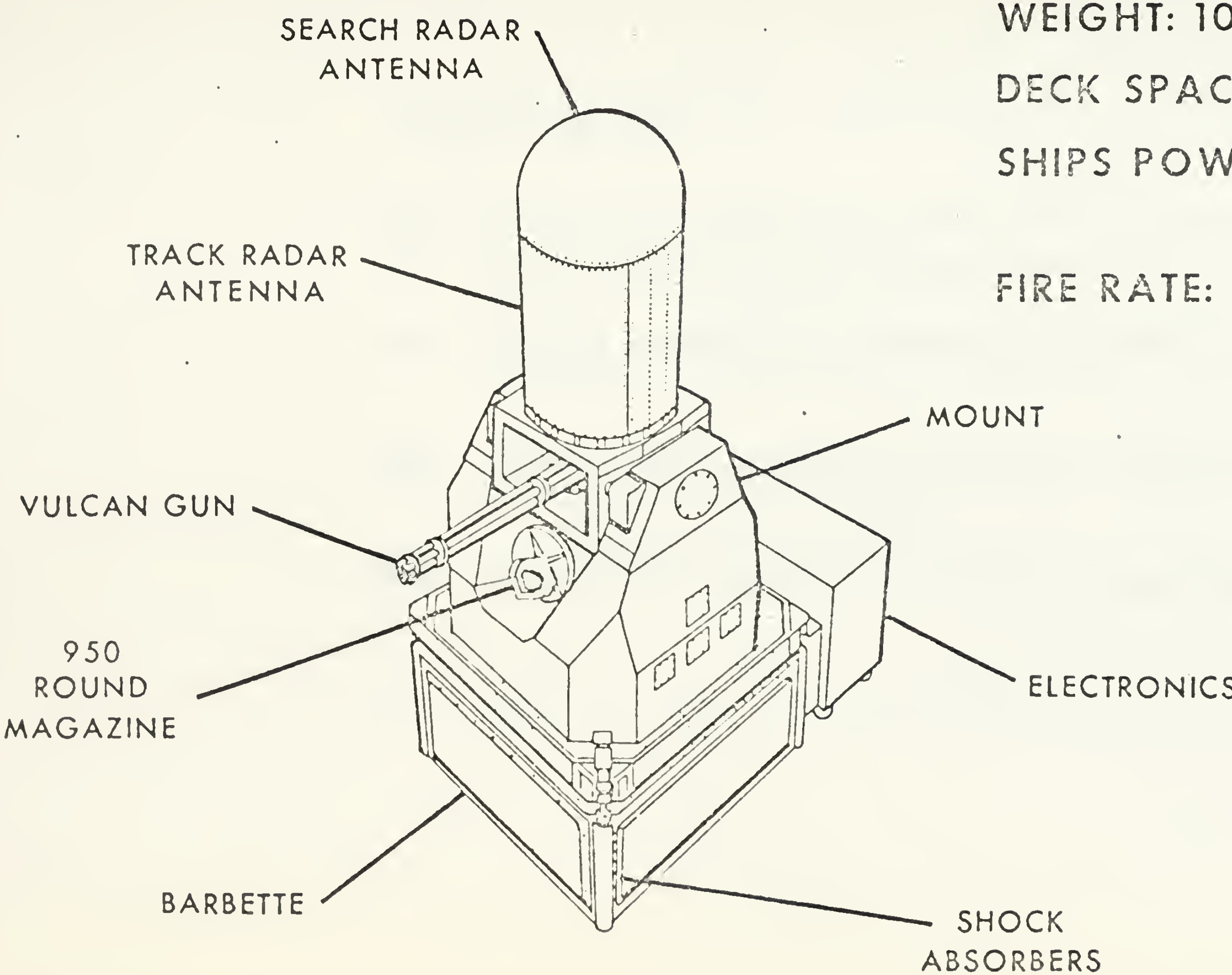
HEIGHT: 15' 5"

WEIGHT: 10,000 LBS

DECK SPACE: 58 FT^2

SHIPS POWER: 50 KW 60Hz
OPERATING

FIRE RATE: 3000 RPM



POINTS TO BE MADE

* (U) ELECTRONIC SPOTTING FEATURE PROVIDES GUN AIMING ACCURACY BETTER THAN ANY EXISTING FIRE CONTROL SYSTEM.

* (U) SYSTEM IS AUTONOMOUS HAVING NO DEPENDENCE UPON OTHER SYSTEMS; FULLY AUTOMATIC REQUIRING NO MAN IN THE LOOP.

* (U) "SINGLE STRUCTURE" DESIGN FACILITATING FAST, LOW COST INSTALLATION ABOARD WIDE VARIETY OF SHIPS.

* (U) IMPROVED AMMO DESIGNED TO PENETRATE MISSILE AND DESTROY ITS WARHEAD.

PHALANX UNIQUE FEATURES

- ELECTRONIC SPOTTING SYSTEM
- AUTONOMOUS,
  FULLY AUTOMATIC SYSTEM
- INTEGRAL DESIGN FOR FAST,
  LOW COST INSTALLATION
- IMPROVED AMMUNITION
  - VELOCITY
  - PENETRATION

POINTS TO BE MADE

* (U) SUB-CALIBER, SPIN STABILIZED PENETRATOR MADE OF DEPLETED URANIUM.

* (U) HAS DISCARDING SABOT & PUSHER.

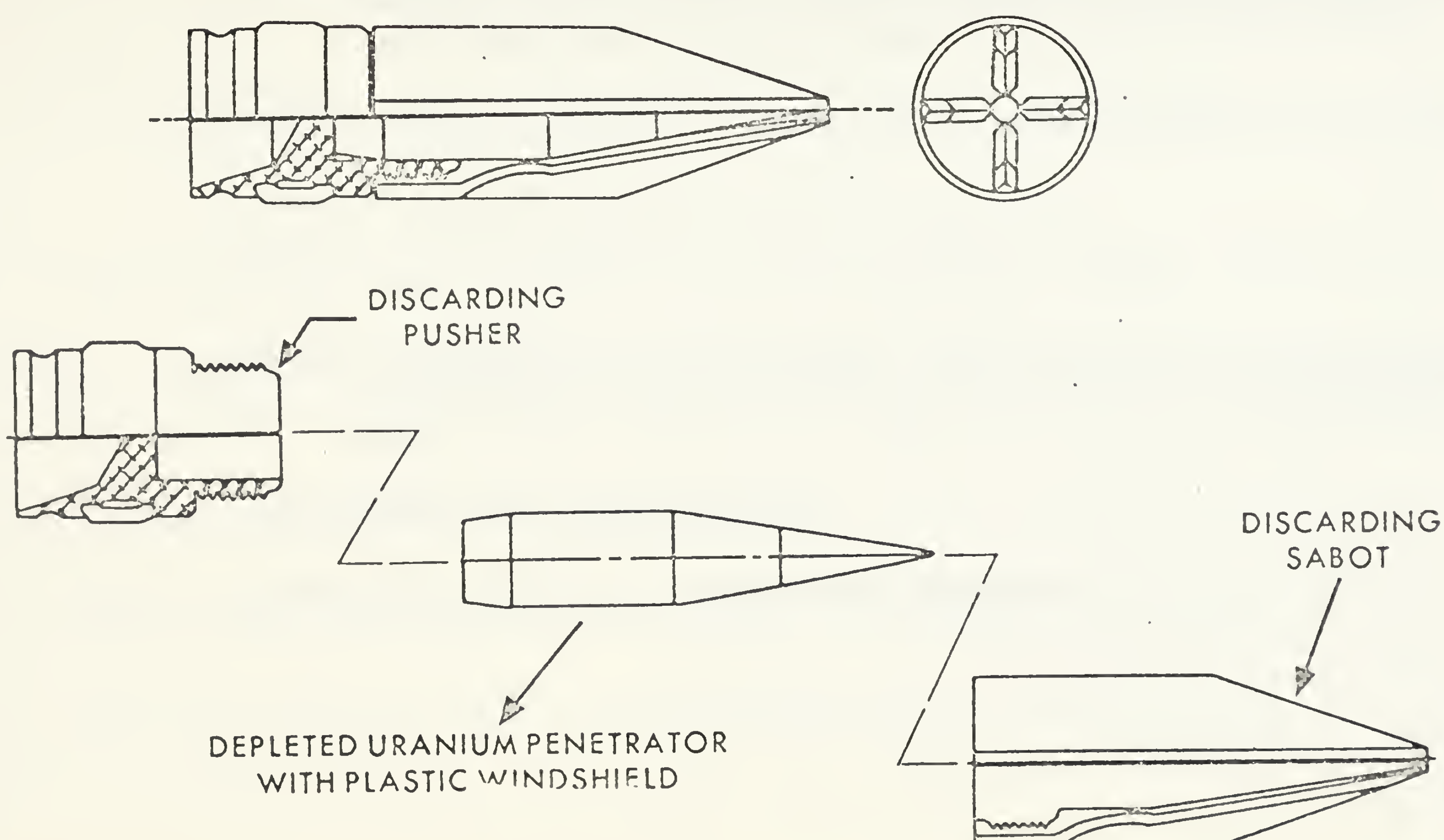
* (U) JOINED TO STANDARD 20MM CASE

* (U) PENETRATOR WEIGHS 1090 GRAINS, MUZZLE VELOCITY OF 3700 FT/SEC.

* (U) ABOUT 5000 ROUNDS ARE AVAILABLE NOW FOR ROUND QUALIFICATION AND SYSTEM PERFORMANCE TESTS. ADDITIONAL 17,000 UNDER PROCUREMENT FOR AT-SEA OPEVAL. PENDING DOD APPROVAL, AS CALLED FOR BY PROGRAM MEMORANDUM #40, FY 73 FUNDS ARE AVAILABLE FOR PRODUCIBILITY REFINEMENTS AND PROCUREMENT OF AMMO FOR 6-9 OSM REQUIREMENTS.

* (U) FULL UP ROUND EXPECTED TO COST ABOUT $5.50 EACH BASED ON INITIAL 1 MILLION PROCUREMENT LOT - ABOUT $1700 PER TARGET.

20 MM SPIN STABILIZED DU PENETRATOR



POINTS TO BE MADE

*(U) OSM'S WILL PROVIDE EXTENSIVE TESTS AND DESIGN VALIDATION ON VARIETY OF SHIPS BOTH IN SINGLE AND MULTIPLE UNIT INSTALLATIONS, ON BOTH COASTS AND DIFFERENT OPERATIONAL CLIMATES.

*(U) PLANNED UTILIZATION: 1 TRAINER, 2 LPH-7, 1 DE-1053, 1 LST-1183, 2 AOR-2, 2 DLGN-35.

*(U) PROVIDES SOLID BACKUP TO PROTOTYPE TEST EFFORT.

*(U) INCORPORATES FALLOUT FROM IOT&E AND R/M/A UPGRADE.

*(U) SOLVES MANY PRODUCTION PROBLEMS: VERIFY DATA PACKAGE, MANUFACTURING PROCESSES, SPECS, ACCEPTANCE STANDARDS, TOOLING, TEST EQUIPMENT AND COST BASE.

*(U) PROVIDE NAVY SCHOOL TRAINER

*(U) LIMITED HARDWARE FOR OPERATIONAL EMERGENCY.

WHY OSM'S ARE NEEDED

- PROVIDE EARLY BROAD BASE OF OPERATIONAL EXPERIENCE ON SEVERAL SHIPS.
- PROVIDE EVALUATION ON PRODUCTION TYPE HARDWARE.
- VALIDATE LESSONS FROM IOT&E AND R/M/A UPGRADE.
- SOLVE MOST OF PRODUCTION START-UP PROBLEMS.
- ESTABLISH EARLY IN-HOUSE TRAINING CAPABILITY.
- SOURCE OF UNITS FOR OPERATIONAL EMERGENCY.

POINTS TO BE MADE

✲(U) UP TO THIS POINT, THERE ARE MANY THINGS THAT HAVE BEEN ACCOMPLISHED. THEY PROVIDE THE BASIS FOR TODAY'S DECISION.

✲(U) ACQUISITION AND SUBSEQUENT EVALUATION OF 6 TO 9 OPERATIONAL SUITABILITY MODELS IS AN IMPORTANT STEP IN THE OVERALL PROCUREMENT PROCESS. IT IS THE NAVY POSITION THAT THE RISK INVOLVED IS ACCEPTABLY LOW AND JUSTIFIED BASED ON DEMONSTRATED TESTS TO DATE WITH THE ENGINEERING DEVELOPMENT MODEL.

BASIS
FOR TODAY'S DECISION

MAJOR ACCOMPLISHMENTS TO DATE:

- CONVERSION TO Ku BAND
- AMMO LETHALITY
- SEARCH/TRACK HANDOVER
- HOT-COLD, VIBRATION TESTS
- LOW LEVEL TRACKING
- DETECTION PROBABILITY
- ON MOUNT STABILIZATION
- REACTION TIME
- PACKAGING CONFIGURATION

ASSESSMENT

SYSTEM IN 90% FINAL FUNCTIONAL AND 60% FINAL PHYSICAL CONFIGURATION WILL AUTOMATICALLY DETECT, ACQUIRE, FIRE AT AND HIT LOW INCOMING MACH 0.6 TARGETS OVER WATER WHILE UNDER SIMULATED SHIP MOTION

3 TO 5 HITS WITH OPTIMIZED AMMO IS LETHAL AGAINST REPLICAS OF STYX

POINTS TO BE MADE

*(U) IMPORTANT SYSTEM SPECIFICATIONS AND PERFORMANCE PARAMETERS ACHIEVED WITH THE ENGINEERING DEVELOPMENT MODEL AND PREDICTED FOR THE PROTOTYPE ARE COMPARED WITH THRESHOLDS CALLED OUT IN THE DCP.

*(U) MEETING OR BETTERING THRESHOLD CRITERIA

*(U) MOVIE TO ILLUSTRATE SOME IMPORTANT TESTS.

POINTS TO BE MADE

✲ (U) 23 MONTHS THRU 36 MONTHS ENGINEERING DEVELOPMENT

✲ (U) PERFORMANCE TESTS ON ENGINEERING DEVELOPMENT MODEL COMPLETED — GOOD RESULTS.

✲ (U) PROTOTYPES IN FABRICATION-EXPECT TO COMPLETE NEXT MONTH.

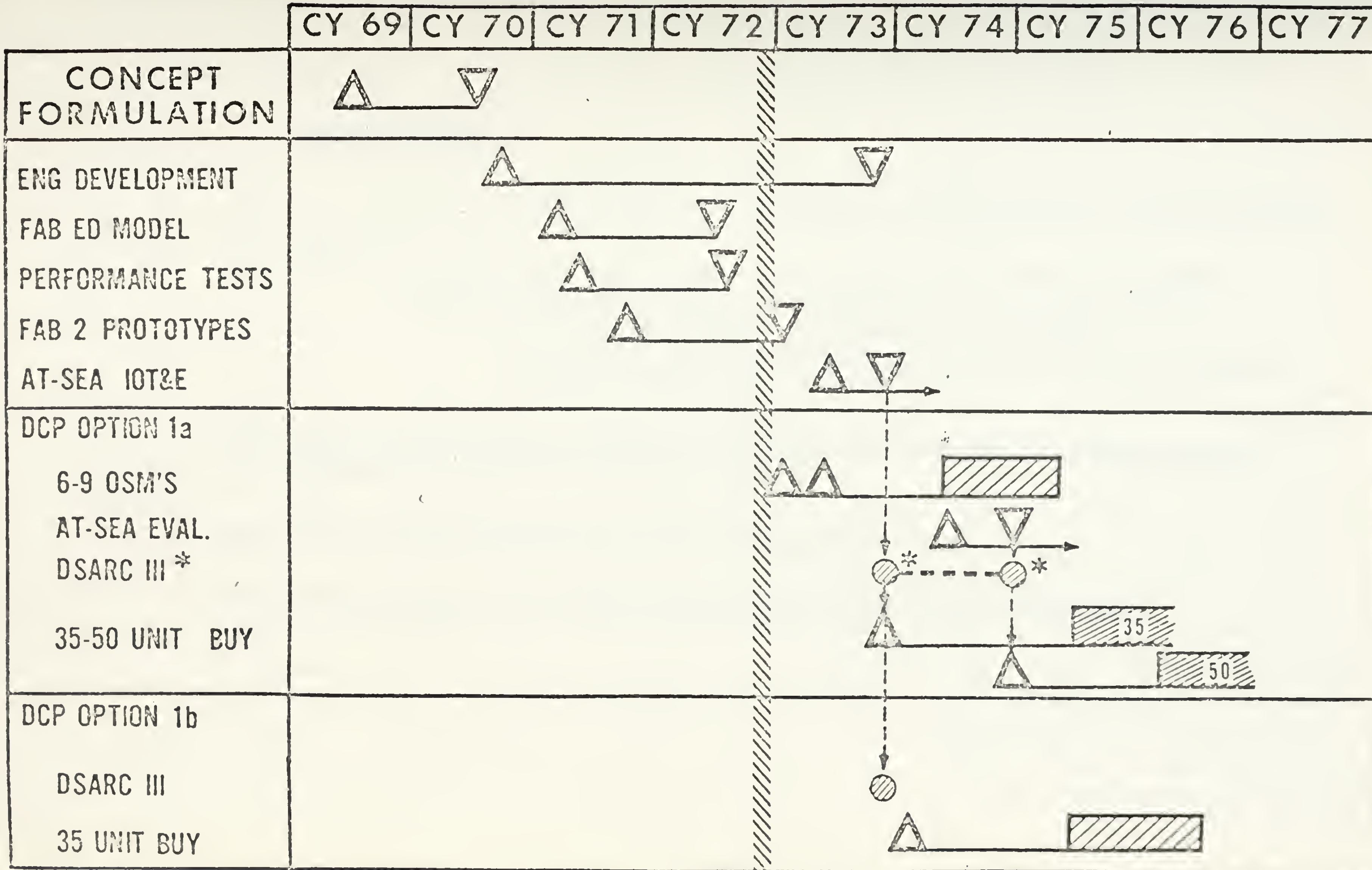
✲ (U) AT-SEA IOT&E WITH #1 PROTO--APRIL-SEPT 1973.

✲ (U) PROPOSAL ON 6-9 OSM'S IN NEGOTIATION-PLANNED DELIVERY AND AT-SEA EVALUATION AS SHOWN.

✲ (U) GO AHEAD FOR PRODUCTION UNDER OPTION 1a IS KEYED TO RESULTS FROM IOT&E OR EVALUATION OF OSM'S — WHICHEVER IS NECESSARY TO BECOME READY FOR PRODUCTION.

✲ (U) GO AHEAD FOR PRODUCTION UNDER OPTION 1b IS KEYED TO COMPLETION OF IOT&E WITH PROTOTYPES.

PROGRAM STRUCTURE



* NOT A FIXED CALENDAR DATE

POINTS TO BE MADE

* (U) ACTIVITY OF #1 PROTOTYPE FOR CTE, NTE, IOT&E. #2 FOR TRAINING, R/M/A UPGRADE EFFORT.

* (U) COMMITTMENT OF FUNDS FOR OSM GO AHEAD KEYED TO ACHIEVEMENT MILESTONES.

  EXAMPLE: LONG LEAD TIME (LLT) FUNDING FOR OSM'S REQUIRES PROTOS 1 & 2 COMPLETE FABRICATION AND INITIAL CHECKOUT

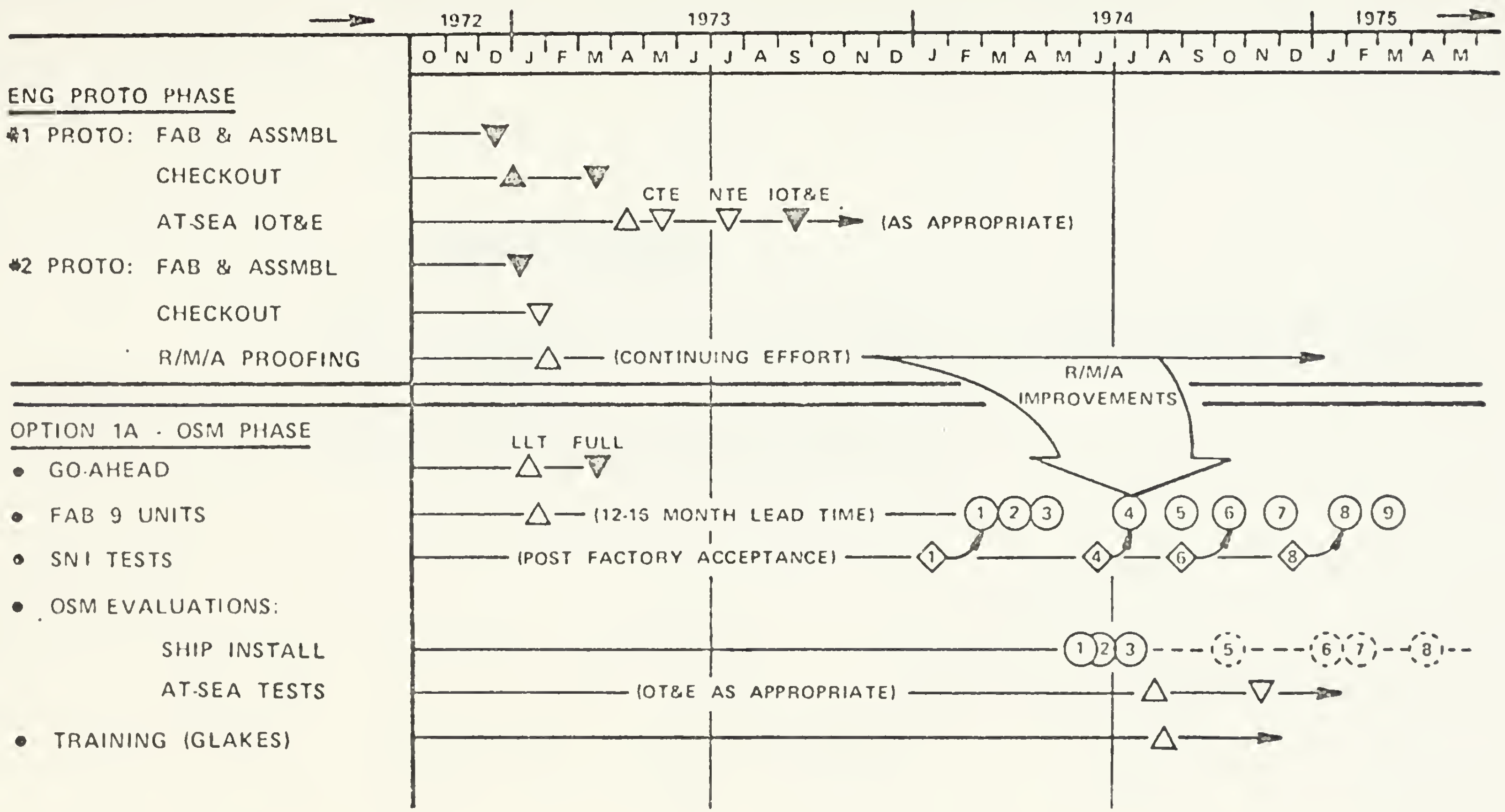
  FULL GO AHEAD (FULL) FUNDING FOR OSM'S REQUIRES OPERATIONAL CHECKOUT OF #1 PROTO AT TEST SITE

* (U) POST FACTORY ACCEPTANCE TESTS AT SAN NICOLAS ISLAND (SNI) TO DEMONSTRATE PERFORMANCE & R/M/A PRIOR SHIP INSTALLATION.

* (U) EVALUATION WILL BE CONDUCTED ON OSM'S AS APPROPRIATE.

* (U) PRODUCTION WILL KEY FROM IOT&E OR EVALUATION OF OSM'S AS REQUIRED.

MAJOR ELEMENTS OF CURRENT PLAN



POINTS TO BE MADE

✲ (U) THERE ARE SEVERAL AREAS OF SPECIAL INTEREST THAT BEAR ON TODAY'S DECISION.

✲ (U) EACH TO BE ADDRESSED SEPARATELY.

SPECIAL INTEREST AREAS

- REMAINING TECHNICAL MILESTONES
- RELIABILITY/MAINTAINABILITY/AVAILABILITY
- TEST AND EVALUATION
- COST: ENG DEVELOPMENT, PRODUCTION
- ILS: SPARES, IN-SERVICE ENGINEERING
- TRAINING/MANNING REQUIREMENTS
- FOREIGN INTEREST
- FLEET INSTALLATION PLANNING

POINTS TO BE MADE

- (U) AREAS OF TECHNICAL UNCERTAINTY.
- (U) WILL BE RESOLVED IN THE COURSE OF PLANNED TESTS OR DEMONSTRATIONS.
- (U) NONE INVOLVE HIGH TECHNICAL RISK.

POINTS TO BE MADE

*(U) MTBF WITH ENGINEERING DEVELOPMENT MODEL AT 56 HOURS. PROTOTYPES EXPECTED TO REACH 80 HOURS. PLANS FOR REACHING HIGHER GOALS ARE BEING IMPLEMENTED.

*(U) WITH #2 PROTOTYPE DEDICATED FOR THIS PURPOSE, AN OFF-LINE, NON-LINEAR APPROACH TO RELIABILITY IMPROVEMENT WILL BE UNDERTAKEN. WILL RECOGNIZE AS WELL AS EXPLOIT OPERATIONAL REALITIES, FOCUS ON WEAK SISTER COMPONENTS, EXPERIMENT WITH INCREASED BUILT-IN TEST EQUIPMENT, PREDICTIVE FAILURE SENSORS, REDUCTION IN MODE STRESS AND SELECTIVE RELAXATION IN SPECIFICATIONS.

*(U) POSSIBLE IMPROVEMENTS WILL BE EVALUATED IN LIFE CYCLE COST MODELS, PROOFED IN #2 PROTO AND INCORPORATED IN OSM'S AS PRACTICAL FOR FURTHER OPERATIONAL VALIDATION.

*(U) CONFIDENCE THAT DURING 2000 HOUR MISSION SYSTEM BE OFF THE LINE IN AN UNPLANNED WAY NO MORE THAN 2% OF THE TIME WILL BE ESTABLISHED BY SUCCESSIVE TESTING WITH THE OSM'S.

RELIABILITY/MAINTAINABILITY/ AVAILABILITY

- EXPERIMENTALLY ORIENTATED R/M/A UPGRADE EFFORT — LOOKING FOR HIGH LEVERAGE PAYOFF
- IN PARALLEL TO AND UNDER SEPARATE CONTRACT WITH BASIC PROGRAM
- REQUIRES \$3.0M RDT&E
- EXAMPLES OF POSSIBLE R/M/A IMPROVEMENTS:

  INCREASE HI-REL PARTS
  SELECTIVE REDUNDANCY
  PACKAGING ARRANGEMENTS
  PREDICTIVE FAILURE SENSORS
  INCREASED BITE
  REDUCTION IN MODE STRESS
  SELECTIVE RELAXATION IN SPECS

- GOAL OF 95% PROBABILITY OF NO UNMONITORED CRITICAL FAILURES BETWEEN DSOT'S, 98% SYSTEM AVAILABILITY

POINTS TO BE MADE

* (U) HIGH RISK AND MOST DIFFICULT TECHNICAL AREAS WERE RESOLVED EARLY IN ENGINEERING DEVELOPMENT.

* (U) PROGRAM SUCCESS TO DATE IS BASED ON CONCLUSIVE AND PROGRESSIVELY MORE DIFFICULT TEST RESULTS.

* (U) FUTURE TESTS INVOLVE ENGINEERING PROTOTYPE AND OPERATIONAL SUITABILITY MODEL (OSM) HARDWARE.

* (U) TESTS WILL BE CONDUCTED IN THE FACTORY, AT SAN NICOLAS ISLAND (SNI) AND ABOARD SHIP.

* (U) HEAVY EMPHASIS ON WHITE HAT PARTICIPATION UNDER AUSPICES OF DEPOPTEVFORPAC.

* (U) EXPECT TO GAIN FULL RANGE OF OPERATIONAL EXPERIENCE INCLUDING OPTIMUM SHIPBOARD PLACEMENT, INSTALLATION PREPARATION AND COST, INTERFACE REQUIREMENTS, EMPLOYMENT DOCTRINE, OPERATING PERFORMANCE, RELIABILITY AND MAINTAINABILITY, TRAINING EFFECTIVENESS AND LOGISTIC SUPPORT REQUIREMENTS.

TEST AND EVALUATION

TESTS SUCCESSFULLY DEMONSTRATED TO DATE

- FREQUENCY CONVERSION
- SEARCH/TRACK HANDOFF
- ON-MOUNT SERVO STABILIZATION
- STRUCTURAL & ENVIRONMENT CRITERIA
- ENG DEV MODEL OPERATIONAL PERFORMANCE
- AMMO LETHALITY

TESTS PLANNED TO BE CONDUCTED ON ENG PROTO'S & OSM'S

- FACTORY ACCEPTANCE ON #1 & 2 ENG PROTO'S
- SHORE SITE (SNI) CHECKOUT ON #1 PROTO
- R/M/A PROOFING ON #2 PROTO
- AT-SEA CTE, NTE, IOT&E ON #1 PROTO
- BARGE SHOCK TEST ON #1 PROTO
- DEMONSTRATION AGAINST TACTICAL MISSILE(S)

OPERATIONAL SUITABILITY MODEL EVALUATIONS

- FACTORY ACCEPTANCE ON 6-9 OSM'S
- POST FACTORY ACCEPTANCE ON SELECTED OSM'S AT SNI
- AT-SEA EVALUATION OF OSM'S

POINTS TO BE MADE

* (U) PROGRAM COSTS AS CARRIED IN THE FYDP ARE BROKEN DOWN BY APPROPRIATION. SCN FOR NEW CONSTRUCTION INSTALLATIONS ARE EXCLUDED SINCE REQUIREMENTS ARE NOT YET FIRM. FORECAST TO AMOUNT TO $28.OM FY 75, $26.6M FY 76, $24.3M FY 77 FOR 93 CIWS UNITS.

* (U) PROCUREMENT COSTS ARE BASED ON FIRM PROPOSAL FOR 9 OSM'S AND PLANNING ESTIMATES FOR FOLLOW-ON PRODUCTION SUBMITTED BY PRIME CONTRACTOR. CONFIDENCE ZONE IS WITHIN PLUS AND MINUS 10%.

* (U) INSTALLATION COSTS ARE BASED ON AVERAGE OF $250K/UNIT. REFINED ESTIMATES FOR SPECIFIC SHIP TYPES WILL BE AVAILABLE IN NEAR FUTURE WHEN COST AND FEASIBILITY STUDIES ARE COMPLETED.

* (U) ESTIMATES INCLUDE FUNDS FOR REPLENISHMENT SPARES AND AMMO AND THEREFORE DEPICT ACTUAL COST OF DEVELOPMENT PLUS OWNERSHIP THROUGH FY 78.

PROGRAM COST

ALL APPROPRIATIONS — MILLIONS

		FY 73	FY 74	FY 75	FY 76	FY 77	FY 78	TOTAL
BUDGET/FYDP								
(QUANTITY)		(9)	(35)	(80)	(112)	(132)		(368)
DEVELOPMENT	(RDT&E)[1]	15.0	4.7	0.8	0.5	0.4		42.2
PROCUREMENT	(OPN)	23.2	77.9	78.8	98.9	108.5	16.9	404.2
AMMO	(OPN)	1.0	3.4	6.4	9.0	10.6	9.0	39.4
SPARES	(OPN)	3.0	11.0	16.2	21.5	23.1	17.2	92.0
INSTALL	(FMP)[2]		1.0	1.5	18.5	24.5	31.5	76.0
OPS & MAINT.	(O&MN)		0.3	0.5	0.8	1.0	1.3	3.9
OPTION 1a								
(QUANTITY)		(9)						
PROCURENMENT	(OPN)	23.2	1.6					
AMMO	(OPN)	1.0	1.2					
SPARES	(OPN)	3.0	2.0					
INSTALL	(FMP)[2]		1.0	1.3				
OPS & MAINT.	(O&MN)		0.7	1.1				

NOTES: 1. RDT&E FY72 & PRIOR - $20.8

2. AVERAGE INSTALLATION COST ESTIMATED AT $.25/UNIT

POINTS TO BE MADE

* (U) AT THIS PHASE OF THE PROGRAM, VARIOUS ILS ELEMENTS ARE IN EFFECT.

* (U) LEVEL OF EFFORT IS IN KEEPING WITH ASSEMBLY OF TWO ENGINEERING PROTOTYPES, SUBSEQUENT AT-SEA IOT&E AND PROCUREMENT OF 9 OPERATIONAL SUITABILITY MODELS.

* (U) EXPANDED ILS WILL BE IMPLEMENTED AS THE PROGRAM ADVANCES.

PROGRAM COST

ALL APPROPRIATIONS-MILLIONS

	FY 73	FY 74	FY 75	FY 76	FY 77	FY 78	TOTAL
BUDGET/FYDP							
(QUANTITY)	(9)	(35)	(80)	(112)	(132)		(368)
DEVELOPMENT (RDT&E)[1]	15.0	4.7	0.8	0.5	0.4	—	42.2
PROCUREMENT (OPN)	23.2	77.9	78.8	98.9	108.5	16.9	404.2
AMMO (OPN)	1.0	3.4	6.4	9.0	10.6	9.0	39.4
SPARES (OPN)	3.0	11.0	16.2	21.5	23.1	17.2	92.0
OPS & MAINT. (O&MN)	—	0.3	0.5	0.8	1.0	1.3	3.9
OPTION 1a							
(QUANTITY)	(9)	(35) (0)	(80) (50)	(112) (126)	(132) (183)		(368)
PROCUREMENT (OPN)	23.2	77.9 18.6	78.8 79.1	98.9 117.8	108.5 155.8	16.9 10.3	404.2 404.8
AMMO (OPN)	1.0	3.4 1.2	6.4 4.5	9.0 10.3	10.6 16.5	9.0 5.2	39.4 38.7
SPARES (OPN)	3.0	11.0 2.0	16.2 15.3	21.5 25.6	23.1 37.2	17.2 10.2	92.0 93.3
INSTALL (FMP)[2]		1.0 1.0	1.5 1.3	18.5 6.2	24.5 28.8	31.5 42.7	77.0 80.0
OPS & MAINT. (O&MN)		0.7 0.7	1.0 1.1	4.2 4.0	6.2 5.9	6.1 8.4	18.2 20.1
OPTION 1b							
(QUANTITY)		(35)	(80)	(112)	(132)		(359)
PROCUREMENT (OPN)		90.0	90.4	99.4	109.1	10.3	399.2
AMMO (OPN)		2.0	7.0	9.0	10.6	9.0	37.6
SPARES (OPN)		14.0	18.0	21.0	22.5	15.0	90.5
INSTALL (FMP)[2]		—	1.5	18.5	24.5	31.5	76.0
OPS & MAINT. (O&MN)		0.2	1.0	4.2	6.2	6.1	17.7

NOTES: 1. RDT&E FY72 & PRIOR - $20.8 2. AVERAGE INSTALLATION COST ESTIMATED AT $ 25/UNIT

POINTS TO BE MADE

* (U) AT THIS PHASE OF THE PROGRAM, VARIOUS ILS ELEMENTS ARE IN EFFECT.

* (U) LEVEL OF EFFORT IS IN KEEPING WITH ASSEMBLY OF TWO ENGINEERING PROTOTYPES, SUBSEQUENT AT-SEA IOT&E AND PROCUREMENT OF 9 OPERATIONAL SUITABILITY MODELS.

* (U) EXPANDED ILS WILL BE IMPLEMENTED AS THE PROGRAM ADVANCES.

INTEGRATED LOGISTIC SUPPORT

- ILS PLANNING AND MANAGEMENT
  - MAINTENANCE ENGINEERING ANALYSIS (MEA)
- MATERIAL SUPPORT/SPARES PROVISIONING
  - EQUIPMENT REQUIREMENTS ANALYSIS
- RELIABILITY/MAINTAINABILITY ANALYSIS
  - QUALITY ASSURANCE
- PACKAGING, HANDLING, STORAGE & TRANSPORTATION
  - LIFE CYCLE COSTING

POINTS TO BE MADE

✲(U) TRAINING PLAN CONFERENCE HELD. TRAINING PLAN INSTRUCTION READY FOR PROMULGATION

✲(U) INTEND TO ESTABLISH NAVY TRAINING FACILITY SOONEST, RELYING ON CONTRACTOR FOR INITIAL TRAINING SUPPORT ONLY. TWO MEN NOW AT THE PLANT WHO WILL BE OUR FIRST INSTRUCTORS.

✲(U) EMPHASIS ON REDUCING REQUIRED LEVEL OF SKILL — E-5 OR LOWER.

✲(U) SPECIAL RATING COMBINING FTG AND GMG SKILLS LOOKS PROMISING AS MEANS OF REDUCING MANNING LEVEL.

TRAINING / MANNING REQUIREMENT

- FACTORY TRAINING FOR IOT&E STARTING EARLY 1973
- SUBSEQUENT FACTORY TRAINING IN SUPPORT OF OSM'S AS WARRANTED
- FIRST TRAINING UNIT GOES TO GREAT LAKES. ADDITIONAL TRAINING SITES ON EAST AND WEST COASTS AS TRAINING REQUIREMENT INCREASES
- CURRENTLY PLANNING SHIPS FORCE MANNING ON 3 MEN / UNIT OF E-5 GRADE OR LESS.
  TARGET: 2 MEN/UNIT
- POSSIBILITY OF PHALANX SPECIALITY RATING COMBINING NECESSARY FIRE CONTROL AND GUNNERY SKILLS

POINTS TO BE MADE

*(U) SIGNIFICANCE OF NATO INTEREST IS NOT SO MUCH IN POTENTIAL FOREIGN SALES AS CLEAR ENDORSEMENT THAT PHALANX CIWS OFFERS MOST PROMISE AS HIGH PROBABILITY DEFENSE AGAINST SEA-SKIMMER MISSILE THREAT. NATO ENDORSEMENT OF PHALANX FOLLOWED EVALUATION OF SEVERAL CANDIDATE SYSTEMS PROPOSED BY UK, FRANCE, NETHERLANDS, GERMANY AND USA.

POINTS TO BE MADE

* (U) PRESENTATION COVERED PHALANX CIWS PROGRAM OBJECTIVES AS DESCRIBED IN DCP #88. APPROVAL IS REQUESTED.

* (U) APPROVAL OF OPTION 1a IS REQUESTED. INCORPORATION OF 6 TO 9 OSM'S AT LOW FINANCIAL RISK FOR MORE EXTENSIVE DESIGN VALIDATION AND TESTING ON VARIETY OF SHIPS.

* (U) OPTION 1b CONFORMS TO STRICT INTERPRETATION OF FLY-BEFORE-BUY POLICY BUT LACKS BENEFITS AND AVAILABILITY OF HARDWARE OTHER THAN PROTOTYPES.

SUMMARY

OPTION 1a: INCORPORATE 6 TO 9 OSM'S INTO CURRENT PROGRAM, AUTHORIZE USE OF D U FOR AMMO AND APPROVE CARRYING FUNDS FOR 35 UNITS IN FY74 AND 80 UNITS IN FY75

OPTION 1b: CONTINUE PROGRAM WITHOUT 6 TO 9 OSM'S

OPTION 2: TERMINATE CURRENT ENG DEV EFFORT. CONSIDER REDIRECTION OF PROGRAM EFFORT

NAVY RECOMMENDATIONS

- APPROVE DCP #88 AS SUBMITTED
- AUTHORIZE PROCEEDING WITH OPTION 1a INCORPORATING 6 TO 9 OSM'S. DECISION FOR PRODUCTION GO-AHEAD TO BE MADE AT DSARC III

APPENDIX E

Patrol Frigate (PF) Program - Milestone I

DSARC

31 August 1972
1400--1600

Navy Attendees

Dr. Robert A. Frosch	- ASN(R&D)
Mr. Charles L. Ill	- ASN(I&L)
ADM E. R. Zumwalt	- CNO
RADM S. H. Moore	- DEPCOMPT (for ASN(FM))
Dr. P. Waterman	- OASN(R&D)
CAPT P. Gillcrist	- OP-00K1
VADM R. Weymouth	- OP-098
VADM R. E. Adamson	- OP-03
RADM N. Sonenshein	- NAVMAT-00C
RADM R. L. Baughan	- PM-18
RADM M. Sappington	- COMNAVORD
RADM K. Wilson	- VICECOMNAVSHIPS
RADM R. R. Monroe	- OP-96
Mr. Charles DiBona	- CNA

Presentor and Slides

VADM F. H. Price	- OP-97
CAPT E. J. Otth	- PMS-399
Mr. J. Albanese	- PMS-39924
CDR Johnson	- OP-971F1

PF DSARC PRESENTATION

Good afternoon, gentlemen.

I am CAPT Otth, project manager in the Naval Ship Systems Command for the Patrol Frigate. VADM Price has outlined the need for the PF Program and stated how the PF weapons suite and quantity of ships in the program were derived. I will continue this discussion by presenting the implementation aspects of the program. I intend to cover these topics:

- Ship design features
- Procurement approach
- Test and evaluation
- Procurement plan
- Production plan
- ILS concept
- Program cost
- Program risks
- Recommended thresholds

The Patrol Frigate resulting from the trade-off and effectiveness studies is shown in this artist's rendering.

The principal design parameters of the PF are:

Length (WL)	(Parameters not shown due to classification)
Beam	
Navigational draft	
Full load displacement	
Sustained speed	
Maximum speed	
Endurance	

ADMIRAL Price has discussed how the mission analyses were translated into the required conceptual ship with it characteristic weapons and sensors. The chosen conceptual design was the result of many computer iterations of payload and hull combinations which gave us a high level of confidence concerning all salient aspects of the ship design. Given this level of confidence, the CNO set cost, displacement and personnel accommodation goals shown here:

Cost $45M (average cost follow ship 73$)

On balance, the additional $3M investment in a second shaft is truly not cost effective.

Twin screws are obviously more desirable in terms of shafting casualties per se and ship maneuverability in restricted waters. In PF we have addressed this by providing a retractable electric drive auxiliary propulsor located here. This unit is capable of 'taking home' the ship at 4-5 knots in calm seas, and has the added advantage of assisting maneuverability in restricted waters.

Turning now to the procurement aspects of the program we have structured the approach for compliance with DOD DIR 5000.1 and to incorporate the best features of past ship procurements. To do this we have planned four acquisition phases as shown. We are presently four months into the ship system design phase which leads to the contracting baseline for the lead ship. Assisting us in this effort are two competitively selected shipbuilders. The first, Bath Iron Works Corporation, has been designated the lead shipbuilder. In addition to participating with NAVSEC in preparation of the ship system design and specifications the lead shipbuilder will perform planning, detail design, and long lead equipment procurement services as authorized by the Navy. The second shipbuilder, Todd Shipyards, Inc., participates with NAVSEC to assure that the evolving design does not favor the facilities or capabilities of the designated lead shipbuilder and that the final design will be suitable for competitive procurement of follow ships.

By exploiting information derived from the lead ship phase we plan to refine the lead ship baseline to produce a more precisely engineered instrument for series production of follow ships.

Our approach to DODDIR 5000.1 also incorporates an extensive test program.

Supplementing and anticipating the lead ship construction we plan to erect full scale land based test sites individually for the propulsion and combat systems. The objectives of these facilities are shown here.

In addition to providing the means for validating the design engineering aspects of ship integration and the conduct of requisite test and evaluation of the critical PF systems, the two land based test sites will assist in the configuration management of the PF propulsion and combat systems. Throughout the life of the PF program, these sites will be used to evaluate change proposals prior to application to the ships.

After the initial validation of system integration the two land based test sites will also be used to validate operational test and support concepts proposed for the PF. In addition they will serve as system level training facilities.

The central relationship of these test sites to the ship acquisition schedule is depicted here. Land based testing is used in concert with IOT&E plans for individual equipments not now in inventory to achieve requisite level of confidence in the design engineering of ship and equipment before we commit to producing either in quantity. Note that land based testing and equipment IOT&E schedules provide for proofing of key systems two years before completion of the lead ship and coincides with our planned award date for follow ship construction contracts, shown by this vertical time line. At this point we will have sufficient confidence in the combat system/ship integration to warrant follow ship series production. Additional testing and refinement will ensue at the test sites to generate data the Navy and shipbuilders will need later to install and check out these systems.

To build further confidence in the validity of the design for the follow ships, the scheduled start of follow ship construction is contiguous with completion of lead ship fabrication. By the start of follow ship construction, the detail design will be over 3 years mature and validated.

Thus, the PF approach is oriented to minimizing changes during actual construction of the follow ships.

As an example of an equipment IOT&E plan complementing the LBTS, here is the schedule for the MK92/2 FCS which culminates in at sea tests in a DEG. It will undergo factory acceptance tests from May to July 1974. The system will be installed in the DEG along with the 76mm gun during summer 1974. Then these systems will be demonstrated in conjunction with the ship's tartar launching system. In about the same time frame the pilot production MK92/2 system will complete factory acceptance tests and deliver to the LBTS for integration. These correlative evaluations are scheduled so as to attain sufficient confidence to proceed with production by February 1975.

Finally, we will establish a follow ship baseline which is more heavily endowed with non-deviation drawings than any previous surface ship procurement. Where performance requirements best serve, we will be able to use them more precisely as a result of the technical maturity of the ship design.

Standardization, of course, bears a very central relationship to PF integrated logistic support planning. Our principal ILS objectives are:

1. to minimize organizational level maintenance, thereby reducing associated ship manning, and

2. to minimize the off-line time of the PF for extensive depot level maintenance, thereby increasing utilization of the ship.

We have, I believe, put emphasis on first things first. For example, the ship design has been influenced strongly by a requirement to provide easy access to equipment for both in-place maintenance, and where appropriate, for removal. Transfer of maintenance workload from ship to shore will require careful planning. As an example, we have studied the

(pages following omitted)

allocated baseline is completed. This amount is needed for timely prosecution of ship system and detail design and procurement of long lead time equipment for the land based test sites and the lead ship. Award of the lead ship construction contract is planned for the fourth quarter of FY73.

This slide lists the salient program risk items. The risks are essentially to program schedules--there is little technical risk involved. We are developing detailed plans for monitoring the progress of each item in depth and will be aware of any problem areas as soon as they arise. Alongside each item in the slide is the risk management goal and the correlative target and threshold dates by which we expect to have sufficient confidence to proceed with follow ships. Here again are shown the aspects of the PF procurement plan relating to DODDIR 5000.1. So lor ; as we can resolve risks in relation to these milestone requirements we are avoiding concurrency. We would therefore propose that this watch list be included in the DCP with the requirement that we notify you when and if trouble develops and identify a remedial course of action.

Shown here are the recommended thresholds for the PF program. Costs are exclusive of shipbuilder escalation, post delivery changes and outfit. The schedule milestones reflect the watch list data in the previous slide. Of course we have many other management milestones which we can show you if desired.

In summary, I have discussed the ship design features of the PF which are innovative to insure an effective yet

less expensive ship. The PF procurement plan is structured for shipbuilding in full accord with the intent of DODDIR 5000.1. Those systems which have significant impact on success in terms of whole ship integration or individual performance, namely weapons, sensors and propulsion, are to be carefully evaluated and integrated both ashore and where advisable at sea prior to commitment to series production of equipment or follow PF's. I have outlined the 2 block procurement plan which is phased judiciously to allow the lead ship design to mature to confident producibility before the Navy embarks on program expansion.

From the onset of ship system design the program has involved an integration of industry and service talent toward mutual understanding and confidence. The PF program has certain risk items which we will monitor closely to insure earliest identification of problems and development of proper remedial action. Program costs have been maintained essentially within established goals; however, 'then year' escalation effect cannot be accurately forecast. We are nevertheless committed to continue to drive unnecessary costs out of the program. Finally, we have recommended what we believe are reasonable thresholds for program prosecution.

We are seeking authorization of the lead ship, the land based test sites and series production of 49 follow ships in two blocks. Production of follow ships will be on condition that satisfactory IOT&E is achieved, and at that time the Navy will verify satisfactory IOT&E, review the program status, and request ratification of the production decision.

This concludes my prepared remarks. ADMIRAL Price and I will now be happy to entertain any questions.

CNO IMPOSED GOALS

COST	$45M (average cost follow ship 73$)
FULL LOAD DISPLACEMENT	3400 TON
ACCOMMODATIONS	185 TOTAL

(several slides omitted)

PATROL FRIGATE ACQUISITION PHASES

Patrol Frigate Phases	Conceptual Phase		Ship System Design Phase	Lead Ship Phase	Follow Ship Production Phase
	Mission Refine-ment Trade-Offs	Preli-minary Design	Conduct ship system design start detail design and LLT buys	Detail design, start lead ship con-struction develop payload data	Follow ship construction in two blocks
	Operational requirements Base line	Functional Base Line		Lead ship Allocated Base line	Follow ship Allocated Base line

THE DEPUTY SECRETARY OF DEFENSE
Washington, D. C. 20301

Sep 27 1972

MEMORANDUM FOR THE SECRETARY OF THE NAVY

SUBJECT: Patrol Frigate Program

The DSARC review of the Patrol Frigate (PF) Program held 31 August 1972 found that the Navy had done a commendable job in the efforts to design the PF to a cost goal of $45M (FY 73 dollars) per ship. This is an excellent start, but the real job lies ahead in producing the ships within the cost goal. Based on past experience, this is going to be a very difficult task requiring both ingenuity and strong discipline.

I am pleased to note the strong effort to insure adequate test and evaluation (including IOT&E) prior to major contract for follow ships. However, the planned date for the first major contract for follow ships assumes that no critical deficiencies will be found during such testing. The Navy should continue to give emphasis to the completion of all feasible early T&E (including IOT&E) on the combat subsystems and on the land-based test sites. The DSARC and the DDT&E will evaluate at the time of their review of the Navy's recommendation to proceed with follow ships whether adequate test and evaluation (including IOT&E) has been accomplished with satisfactory results, and if not, whether some delay in contracting is warranted.

Also, it may be desirable that a period for operational test and evaluation of the lead ship, prior to that ship's full release to normal Fleet usage, be allocated to OPTEVFOR. The purpose of this testing would be to determine the PF's expected operational effectiveness in its expected roles and the need for any early modification to follow ships. Should such modifications be required, a later DSARC would have to determine the relative merits of opening existing contracts to change by change order procedures or making modifications after acceptance from the shipbuilder.

I have reached the following decisions:

a. The Navy is authorized to proceed with the program for development and construction of the PF lead ship and land-based test sites and advance procurement funding -- $191.5M in FY 1973 for lead ship and land-based test sites and $17.0M in FY 1974 for advance procurement funding.

b. The Navy should continue its planning on the basis of the block construction schedule indicated in the DCP and in the FYDP (24 ships followed by 25 ships, the first block to be awarded to at least three different shipbuilders). The number of PF follow-on ships and/or the need for any further study will be determined through the POM process.

c. 120 days in advance of a proposed DSARC III, an informal review of program test results and contract plans will be provided.

d. Approval of follow ship production should be contingent upon accomplishment of adequate test and evaluation (including IOT&E individually on subsystems, and collectively at land-based test sites) with satisfactory results. Data from such tests must be made available for examination prior to DSARC III, now scheduled for March 1975. In addition, logistics support for the all new systems and training and manpower allocations to support all new requirements shall be presented at the same time.

e. The Navy is requested to develop a plan for, and evaluate the impact of assigning the lead PF to OPTEVFOR for a reasonable period to complete an at-sea operational appraisal of the PF as a whole prior to the lead ship's full release for Fleet usage. This plan and evaluation, together with the Navy's recommendations, should be submitted to OSD at the time of preparation of the revision to the DCP for initiation of construction of the first follow ship.

f. In light of the strong start the Navy has made in the design of the PF to a cost of about $45M (FY 73 dollars unescalated), I want to insure that all efforts are made to insure that the cost goal is achieved in production. I therefore direct that all periodic management and DSARC reviews highlight the Navy's performance in meeting a cost goal of $45M (in FY 73 dollars excluding shipbuilder escalation and outfitting and post delivery costs) and the reasons for any increases. A threshold of $50M under the same stipulations will be established in the DCP.

Deferred funds will be released by separate action.

/s/ Kenneth Rush

DSARC CHECKLIST—PROGRAM DECISION

HAS CONCEPT FORMULATION BEEN COMPLETED?

Is the Program ready to transition to validation?

1. Operational/Mission:

a. Threat/military need/opportunity—how well defined? How credible? How stable or timely?

b. Operational concept and objectives—new tactics or doctrine required? Tested or gamed against threat? Results?

c. How important is this capability? Ranked with other capabilities?

d. Below what capability level is this not worth doing? Above what capability level are technical, cost, or schedule risks too great?

2. System Alternatives and System Analysis:

a. What alternatives considered? Cost effectiveness of each (operational performance and reliability *vs* cost and schedule)?

b. What measures of effectiveness considered and used? Sensitivity analysis? Results?

c. Validity of key assumptions? Who agreed to these?

d. Confidence in the system analysis? Thoroughness? Objectivity? Who did it?

e. Best arguments for and against each alternative? Risks? Criteria for selection?

3. Technical:

a. Primarily engineering or experimental? Most difficult characteristics? Ranking of approaches by technical risks? Formal Risk Analysis?

b. State-of-the-art for key subsystems and components? Design validated by laboratory demonstration? Back-up programs?

c. Confidence in achieving technical objectives in time and dollar budgets? Effect on operational performance and budgets if only "most likely" rather than optimistic is achieved? At what level of technical achievement should program be killed? Performance thresholds?

d. Preliminary performance specifications prepared? How much can bidders vary from specified approaches?

e. Test and evaluation plan consistent with proposed program commitments?

4. Cost:

a. Confidence in cost estimates? Development? Production? O&M?

b. Who made cost estimates? How? Does estimator's position make him optimistic?

c. Have costs been validated by OASD (systems analysis)?

d. Cost of proposed program vs. comparable items? How sensitive to schedule?

e. Would contractors take contract at estimated cost if no way to "get well"?

5. Schedule:

a. Confidence in schedule estimates? Development? Production? IOC?

b. Schedule of this program vs. comparable items?

c. Urgency of schedule? Why not slip IOC date?

d. Pacing items? Confidence that schedule for these will be met? Defer program commitment until more confident?

e. Schedule thresholds?

6. Procurement:

a. Alternative contractor structures (prime, associate)? Pros and cons?

b. Kinds of contracts (CPFF, FFP, FPI, etc.)? Are these same for Validation Phase, development, production? Are these appropriate? Pros and Cons?

c. How to limit premature Government commitment? By Achievement Milestones in contracts? Excessive contractor risks?

d. Initial procurement – how competitive? How to maintain competition?

e. Procurement plan, e.g., Validation Phase followed by Full Scale Development; parallel competitive development, etc.?

f. Indicate what has been done to scrub RFP of unnecessary or marginal performance, management and data requirements.

g. Has Advance Procurement Plan (APP) been prepared? Has a copy been forwarded to OASD(I&)?

7. Program Management:

a. Service management of contractors – how much? What kind? Monitor? Control?

b. Service Program Manager – how long on program? Experience? Authority for engineering and contract changes, funding, etc.? Number of approval levels between Program Manager and DepSecDef?

c. His staff now? Later? Their experience? Capability? Other help, e.g., FCRC, Government Lab? Independent capability for important areas (contracting, reliability, etc.)? Tenure of key members of PM staff?

d. For Joint Service Programs has Joint System/Project Manager Charter been established and approved? If Not, Explain?

8. Presentation. The presentation should relate to and include comments on the DCP, specifically addressing the issues contained in the DCP. The presentation must reveal the status of the program's readiness to transition to the next phase; *that is*, that the prerequisites to Validation Phase have been satisfactorily accomplished).

a. Primarily engineering rather than experimental effort is required, and the technology needed is sufficiently in hand.

b. The mission and performance envelopes are defined.

c. The best technical approaches have been made.

d. A thorough trade-off analysis has been made.

e. The cost effectiveness of the proposed item has been determined to be favorable in relationship to the cost effectiveness of competing items on a DOD-wide basis.

f. Cost and schedule estimates are credible and acceptable.

DSARC CHECKLIST—RATIFICATION DECISION

HAS VALIDATION BEEN COMPLETED?

Is the program ready to enter full scale development?

1. General:

a. Have program objectives changed since CF/Validation Phase completed? How and why?

b. Confidence in achieving current objectives (operational performance, cost, schedule)? Basis for confidence?

c. New risks or increases in already known risks identified in Validation Phase? Total risk greater or less than before Validation Phase?

d. Significant changes in key premises or characteristics? If yes, reassessment of new estimates vs. military value? Thresholds on key characteristics or premises?

2. Technical:

a. Proposed development vs. present state-of-the-art? Primarily engineering rather than experimental?

b. Was design extended far enough in Validation Phase to identify risks? Name highest risk areas—how risky? Design validation of risk areas? Back-up programs needed? With these risks, should we proceed with "hard" development contracts?

c. Significance of variations in technical aspects by competing Validation Phase contractors? How or why is winner's the best?

d. Are performance and test specifications matched to program, state-of-the-art, kind of management? Flexible enough without contract changes?

e. Test and Evaluation plan consistent with proposed program commitments? Integrated test program?

3. Cost:

a. How realistic are cost estimates? Basis? All significant cost elements; *for example*, test facilities/equipment) included?

b. Significant differences in cost estimates between Government and contractors? Analysis of these differences? Do they give clues to uncertainties in real cost? Clues to whether we should go ahead?

c. Have program costs been validated by OASD (systems analysis)?

d. Compare cost estimates for this program to similar programs? Differences? Analysis of differences?

e. What program features most affect total cost, funding rate, R&D vs. other funds? What program options (*examples:* change overall schedule, do pacing subsystems first, test less before production release) help cost or funding? Program designed to avoid excessive funding peaks? Excessive early expenditures?

4. Schedule:

a. How to preserve IOC date and minimize early resource commitments? What parts of program are deferrable? For how long?

b. Realism of IOC date; *that is*, will all necessary items be ready (tactics, trained

people, facilities, test equipment, spares, etc.)? Who is making these schedules mesh? Non-R&E resources programmed?

c. Difficulty of schedule? Pacing elements? Which ones most likely to slip? Action to reduce this risk?

d. Significant differences in schedules by competitors? Analysis of these differences? Clues to uncertainties and the real contract schedule?

5. Program Management:

a. What is the service management staff for this program? Adequate? Need to do something; *for example*, high-level program manager, get him more help? His tenure and that of his key personnel?

b. Service management concept tailored to program, contract type, etc.? How will contractor be managed (monitor, control)?

c. Government and contractor cost, schedule, technical performance reporting systems? Will they predict? How close to real time on major aspects?

d. Any new management systems or techniques? What are they?

e. For joint service program—have joint service operating procedures been developed—if not explain.

6. Management:

a. Has updated Advance Procurement Plan been submitted to OASD(I&L)?

b. Procurement plan matched to program and risks? Contract type consistent with risks? Contractual achievement milestones?

c. Contract negotiated while competition existed. Contract incentives? Do they motivate? Importance to us?

d. "Goodness" of contract from Government view? Contractor's?

e. Additional commitments by contractor; *for example*, production options? Adequate flexibility for Government?

f. What happens if contractor gets in trouble? What options does the Government have?

g. Is this a "buy-in"? Any contract features to help contractor "get well"? Prevent him from "getting well"? Has suspected "buy-in" been discussed with bidder's top management?

7. Contractor and Proposal:

a. Best contractor or best proposal? How better? Strong points? Weak points?

b. Difference in evaluation of competing proposals? Winner best in which areas? Are they the most important areas?

c. Competence of winner and loser, judged by Validation Phase effort alone? Past records of competitor (cost, schedule, performance)? Other factors evaluated?

d. Importance of program to contractors? Contractor's Validation Phase team to do development? Continuing high-level attention?

e. Major associate and subcontractors identified and committed?

f. Indicate what was done to scrub the RFP and proposal of unnecessary and marginal requirements for performance, management, and data requirements.

8. Presentation. The presentation shall ascertain that the program proposed to go forward is consistent with the DCP and its thresholds.

DSARC CHECKLIST—PRODUCTION DECISION

HAS DEVELOPMENT BEEN COMPLETED?

Is the system ready for release to production?

1. General:

a. Significant program changes during development? *Examples:* expected operational availability date? initial production cost? military need? utility of item this is to replace? technology breakthrough? program objectives?

b. Compare original program goals (cost, schedule, performance) with current expectations.

c. Original evaluation of importance of this capability vs. current evaluation.

2. Technical:

a. Status of development? Any items not design frozen? Any prototype items not yet fabricated? What tests not yet completed? Integrated prototype lab tests? Operationally tested? Reliability tested? All achievement milestones completed (prerequisite to production)?

b. Status of accessory and auxiliary items? Test equipment/facilities? Training equipment, materials/instructions? Nucleus of trained people?

c. Remaining technical risks. Rate and significance of design changes?

d. New technology to be considered before production?

e. Status and quality of specifications?

f. Test program consistent with proposed program commitments? Integrated test program?

3. Cost:

a. How realistic are production cost estimates? Basis? All significant cost elements; *for example*, test facilities/equipment included?

b. Have program costs been validated by OASD (systems analysis)?

c. Compare production cost estimates for this program to similar programs. Differences? Analysis of differences?

d. What program alternatives may help cost and funding? (*Examples:* schedule change, breakout, open up for competition.)

e. What program features most affect future costs? Funding rate? Program designed to avoid excessive funding peaks? Excessive early expenditures?

4. Schedule:

a. How to preserve IOC date and minimize early commitments?

b. Do what now to improve probability of meeting schedule? Pacing items? Which most likely to slip?

c. How much concurrency and schedule compression? Necessary? Gains vs. risks? Extra resources or management action required because of compression?

d. What factors external to program (threat; associated hardware, construction, or software) most influence schedule?

e. Realism of IOC date; *that is*, will all necessary items be ready (tactics, trained people, facilities, etc.)? Who is making schedules mesh? Non-R&D resources programmed?

5. Procurement:

a. Has updated Advance Procurement Plan been submitted to OASD (I&L)?

b. Size of first production buy? Why this quantity? Priced options for additional quantities? Adequate Government flexibility re options?

c. First buy competitive? Pros and cons? When competitive?

d. Under what circumstances will first buy be competitive? What criteria for selection? How important is cost? Technical?

e. What has been done to assure that technical data package is adequate for production release? When? Pilot Production? Reviewed by independent agency? Bind contractor to data package or performance requirements?

f. Does contract contain provisions to assure adequacy of data package for production prior full-production release? Options?

g. Indicate what was done to scrub RFP and proposal of unnecessary and marginal performance, management and data requirements.

6. Program Management:

a. Service management concept tailored to program and contract type? How will contractor be managed (monitor, control)?

b. Government and contractor cost, schedule, technical performance reporting systems? Will they predict? How close to real time on major aspects?

c. Configuration management? Integrated logistics support? Other important management information systems?

d. Present (and planned) integration between design and production engineering? Motivation to design for producibility? When will production contractor enter program (if different from developer)? How to transfer know-how from developer?

e. Service management staff? Adequate? How different for production phase? Early field engineering support? Continuing technical support? Tenure of project manager and key personnel. Authority re support organizations? Authority for changes to contract, specifications, funding, etc.?

7. Presentation. The presentation shall ascertain that the program proposed to go forward is consistent with the DCP and its thresholds.

APPENDIX

CHECKLIST FOR MILESTONE I REVIEWS

(END OF CONCEPTION PHASE AND ENTER VALIDATION PHASE)

Purpose of Milestone I ASARC/DSARC.

The purpose of the Milestone I review is to determine whether or not the Conceptual Phase has been completed and whether the program is ready to transition to the Validation Phase. The Milestone I review will be held at such time that the Army has determined that—

a. The system satisfies a real military need, is worth its cost and is of sufficient priority to be funded within overall fiscal contraints. The proposed development is in consonance with the Required Operational Capability (ROG).

b. Mission profiles and performance envelopes are adequately defined and are based upon sound and balanced military, technical and economic objectives.

c. Major uncertainties are identified and a suitable method of resolution is planned for the Validation Phase.

d. Preliminary cost and schedule estimates are realistic and acceptable.

e. The management approach and program planning are sound.

f. The DCP/DPM/APM thresholds are well defined and provide th flexibility for accomplishing the appropriate trade-offs in the Validatic Phase while insuring the surfacing of significant problems.

g. Critical questions and issues associated with operational suitability, effectiveness, C-E systems, electromagnetic compatibility, the adequacy and essentiality of signal security features and characteristics and frequency supportability are identified to the maximum extent possible.

h. The environmental impact is minimized and acceptable.

i. Logistic planning appropriate to the Conceptual Phase has been accomplished.

1. *BACKGROUND.*

The presentation should relate to the ROC and the DCP/DPM/APM, specifically addressing issues and the viability of thresholds. It must address the program's readiness to transition to the next phase (i.e., pre-

requisites). The presentation shall assure that the proposed program is consistent with the DCP/DPM/APM. The operational, technical, scheduling, costs, procurement and program management considerations of indirect or "spillover" effects of the system should be addressed.

2. *OPERATIONAL ASSESSMENT.*

a. Threat/military need/opportunity—how well defined? How credible? How stable or timely? Precise statement of the ROC?

b. Operational concept and objectives—new tactics or doctrine required? Tested or gamed against threat (to include EW and SIGINT exploitation) and appropriate environments including the electromagnetic environment? If the system radiates electromagnetic energy, has a conceptual, formal vulnerability analysis been performed? Results?

c. Has the Army Analysis of Intelligence (AAI) been considered in the development of the threat or separately developed threats been coordinated with ACSI during each stage of development?

d. How important is this capability? Ranked with other capabilities?

e. Below what capability level is this not worth doing? Above what capability level are technical, cost, or schedule risks too great? Target level established by trade-offs?

f. Have issues to be addressed through operational testing been identified?

g. Does the test program adequately address operational mission issues?

3. *SYSTEM ALTERNATIVES AND SYSTEM ANALYSIS.*

a. System alternatives.

(1) What alternative systems and system designs have been considered? Present system considered? Cost and benefits of each (operational performance, reliability, maintainability and electromagnetic capability versus total life-cycle cost to include electromagnetic frequency spectrum usage and schedule)?

(2) What measures of benefits/effectiveness considered and used? Sensitivity analysis? Results? Issues in need of operational testing?

(3) Confidence in system analysis? Thoroughness? Objectivity? Agency doing system analysis?

(4) Best arguments for and against each alternative? Risks? Criteria for selection?

(5) Marginal features?

b. Cost and benefits analysis.

(1) Confidence in cost estimates to include parametric cost analyses? Development? Production? Cost of ownership? MCA?

(2) Confidence in benefits of effectiveness estimates?

(3) Who made estimates of cost? Of effectiveness? How? How was objectivity assured? Have the costs been explained in terms of required effectiveness for all or part of the forces in terms of realistic contingency missions (quality and quantity trade-off analysis).

(4) Have costs been validated by COA and/or OASD (Systems Analysis)?

(5) Cost of proposed program versus comparable items in comparable dollar terms? How sensitive to schedule?

(6) Are DCP/DPM/PM itemized costs expressed in both constant and then year dollars?

(7) How have provisions been made to assure traceability of estimates? Will overhead estimates for both the in-house and contractor costs be visible throughout the program?

(8) How will the program insure that discrete cost elements will be translated into "design to" requirements?

(9) Is the impact on the electromagnetic spectrum considered in the cost and benefit analysis?

4. *TECHNICAL ASSESSMENT.*

a. Primarily engineering or experimental? Most difficult characteristics? Ranking of approaches by technical risk? Formal Risk Analysis? Relate consequence of failure to risks.

b. State-of-the-art for key subsystems and components? Design validated by laboratory demonstration? Back-up programs? Amount of testing accomplished to eliminate or reduce risks? Assessed in technical portion of RFP?

c. Confidence in achieving technical objectives in time and dollar budgets? Effect on operational performance and budgets if only "most likely" rather than optimistic is achieved? At what minimum level of technical achievement should program be stopped?

d. Do performance thresholds permit trade-offs?

e. Critical OTE questions and issues as identified in the DCP/DPM/APM and CTP? Identify critical questions and issues which must be answered by Development and/or Operational Test and Evaluation and outline the plan and schedule milestones for accomplishing.

f. Are the test and evaluation issues covered in the DCP/DPM/APM and is a proposed schedule of test milestones included? Is adequate time scheduled for test results to be available for consideration prior to decision?

g. Effort planned for Reliability and Maintainability improvement to reduce O&M costs. Have Reliability and Maintainability goals been established? Relate these to mission requirements.

h. Is a competitive prototype program warranted? Is competitive leverage of risk reduction sufficient to provide overall life cycle cost reduction?

i. Will electromagnetic compatibility be assessed to a satisfactory degree?

j. Does DCP/DPM/APM address system susceptibility to EW and SIGINT exploitation.

k. Have all means been considered to eliminate or minimize degradation of the environment?

5. *SCHEDULE.*

a. Confidence in schedule estimates? Development? Production? IOC?

b. Schedule of this program vs comparable items?

c. Urgency of schedule? Why not slip IOC data? What drives required IOC date? Relate this to any concurrency. What are the essential trade-offs?

d. Pacing items? Confidence that schedule for these will be met? Defer program commitment until more confident?

e. What provisions have been made for trade-off with cost and system capability?

6. *PROCUREMENT ASSESSMENT.*

a. Procurement plan, e.g., Validation Phase followed by Full-Scale Development Phase; competitive prototypes; parallel development; kinds of contracts (CPFF, FFP, FPI, etc) for validation, full-scale development, production: Are these appropriate? Pros and cons?

b. Alternative contractor structures (prime, associate)? Pros and cons?

c. How to limit premature Government commitment? Achievement Milestones in contracts? Excessive contractor risks?

d. Initial procurement—how competitive? How to maintain competition?

e. RFP scrub of unnecessary or marginal performance, management and data requirements? What required reports and data unnecessary?

f. Has Advance Procurement Plan (APP) been submitted to ASA(I&L), ASA(R&D), and ASD(I&L) for review?

g. How did the source selection take into account the contractor's capability to develop a necessary defense system on a timely and cost-effective basis?

7. *PROGRAM MANAGEMENT.*

a. Management system for program control. Will MIL STD 881 and DODD 7000.1 be fully implemented?

b. Army management of contractors—how much? What kind? Monitor?

c. Army Project Manager—how long on program? Planned tenure? Experience? Authority for engineering and contract changes, funding, etc.? Number of approval levels between Project Manager and DEPSECDEF?

d. His staff now? Later? Their experience? Capability? Other help, e.g., FCRC, Government Lab? Independent capability for important areas (contracting, reliability, etc.)? Tenure of key members of PM staff?

e. For Joint Service Programs has Joint System/Project Manager Charter been established and approved? If not, explain.

8. *ASARC/DSARC REVIEWS INVOLVING SOURCE SELECTION.*

a. Unsuccessful bidder status? Provide summary comparing the proposed programs of unsuccessful bidders with winning bidder(s).

b. Credibility of cost/perofmance proposed?

c. Did any bidder claim that Government requirements were unrealistic? What basis?

9. *SECURITY.*

Summarize the security classification of the program; system, components, technical characteristics and any other aspects of the program requiring classification.

CHECKLIST FOR MILESTONE II REVIEWS

(END OF VALIDATION AND BEGIN FULL-SCALE DEVELOPMENT)

Purpose of Milestone II ASARC/DSARC.

The purpose of the Milestone II review is to evaluate the readiness of the program to enter Full-Scale Development. The Milestone II review will be held at such time that the Army has determined that:

a. Appropriate analyses (trade-off, parametric cost, cost and effectiveness) are available to confirm the need for the system in consideration of the threat, system alternatives, special logistic needs. communications-electronics impact, estimates of development cost, preliminary estimates of life cycle costs and potential benefits in context with overall Army strategy and fiscal guidance.

b. The system still satisfies a real military need, is still worth its cost, and is still of sufficient priority to be funded within overall fiscal constraints. The development is in consonance with the ROC.

c. Risks have been reduced to acceptable levels and a suitable method of resolution is identified in areas of residual technical risk.

d. System trade-offs have produced a proper balance between cost and performance.

e. Cost and schedule estimates are realistic and acceptable.

f. System configuration and performance specifications have been developed sufficiently to permit Full-Scale Development to begin.

g. The management approach and program planning are sound.

h. The contractual aspects are sound.

i. The DCP/DPM/APM thresholds are well defined and provide sufficient flexibility for engineering development while insuring the surfacing of significant problems.

j. Critical test issues, as identified in the DCP/DPM/APM and the CTP, have been reviewed and refined to determine what T&E (including OTE) must be scheduled and conducted.

k. Electromagnetic compatibility and frequency supportability have been evaluated as being satisfactory.

l. Verification that environmental objectives can be attained.

m. The analysis of vulnerability to hostile EW and SIGINT exploitation is updated and appropriate hardening trade-off analyses accomplished, as appropriate.

n. Logistics planning appropriate to the Validation Phase has been accomplished.

1. *BACKGROUND.*

a. Have program objectives changed since Conceptual Phase completion and during Validation Phase? How and why?

b. Significant changes in key premises or characteristics? If yes, reassessment of new estimates *vs* military value? Thresholds on key characteristics or premises?

c. Threat still credible (conforms with the AAI or has been coordinated with ACSI)?

d. Confidence in achieving current objectives (operational performance, electromagnetic compatibility, reliability, cost, schedule)? Basis for confidence?

e. Formal risk analysis made—New risks or increases in already known risks identified in the Validation Phase? Trade-offs made? Have risks been reduced to acceptable level for Full-Scale Development?

f. What are the operational, technical, cost, scheduling, procurement, and program management implications of indirect or "spillover" effects of the system.

g. Have SIGSEC considerations been addressed as appropriate? System vulnerabilities; development and production of crypto materiel; coordination with NSA or has delegation of authority been obtained for the Army to develop required crypto materiel in support of the system?

2. *OPERATIONAL AND TECHNICAL ASSESSMENT.*

a. Proposed development vs present state-of-the-art? Primarily engineering rather than experimental?

b. Efforts planned for reliability and maintainability improvement to reduce O&M costs. Have reliability and maintainability requirements and thresholds been set? Contractual requirements including test provisions? Icentives?

c. Effort planned for electromagnetic compatibility improvement to minimize impact upon the spectrum. Have electromagnetic compatibility requirements been set? Do these requirements include test provisions?

d. Design extended far enough in Validation Phase to identify risks? Name highest risk areas—how risky? Design validation of risk areas. Back-up programs needed? Available solutions in hand? With these risks, should we proceed with "hard" development contracts?

e. Hardware and/or software testing done to reduce or remove risks?

What critical problems and issues earlier identified as requiring test have been resolved? What critical problems and issues remain to be resolved through test and evaluation (including OT&E) prior to procurement decision and what are the plans and schedule milestones for accomplishing.

f. Significance of variations in technical aspects by competing Validation Phase contractors? How or why is winner's proposal the best?

g. Operational requirements and test specifications matched to program state-of-the-art, kind of management? Flexible enough without contract changes?

h. Test and evaluation plan consistent with proposed program commitments? Integrated test program? Identify achievement milestones?

i. Operational and technical test and evaluation issues been refined and submitted to DDRE for review?

j. Is effort planned to reduce system susceptibility to potential hostile EW threat? The formal vulnerability analysis been updated? Results?

k. Environmental pollution control features have been specifically reviewed and evaluated.

3. *COST AND BENEFITS.*

a. How realistic are cost and benefits/effectiveness estimates? Basis? All significant cost elements (e.g., test facilities/equipment electromagnetic spectrum and cryptomaterial) included? Are costs expressed in both constant year and then year dollars?

b. Significant differences in cost estimates between Government and contractors? Analysis of these differences? Do they imply uncertainties in real cost and performance? "Is a 'should cost' analysis warranted?"

c. Have the costs in terms of required effectiveness for all or part of the forces in terms of realistic contingency missions been assessed (quality versus quantity trade-off analyses).

d. Have program costs been validated by COA and/or OASD (Systems Analysis)?

e. What program features most affect total cost, funding rate, R&D *vs.* other funds? What program options (examples? change overall schedule, do pacing subsystems first, test more or less before production release) help total life cycle cost or funding? Program designed to avoid excessive funding peaks? Excessive early expenditures?

f. Life cycle cost analysis for the alternative proposed programs?

g. Is funding profile consistent with OSD/Congressional constraints?

h. Does a highly visibile cost trail exist thus far?

i. Cost effectiveness versus design alternatives?

4. *SCHEDULE.*

a. Can IOC date be slipped for cost or risk reduction?

b. How to preserve IOC date and minimize early resource commitments? What parts of program are deferrable? For how long? Why are they deferrable?

c. Realism of IOC date, i.e., will all necessary items be ready (tactics, trained people, facilities, supporting communications, test equipment, spares, etc)? Who is making these schedules mesh? Non-R&D resources programed?

d. Difficulty of schedule? Pacing elements? Which ones most likely to slip? Action to reduce this risk. Effect on system(s) to be replaced?

e. Significant differences in schedules by competitors? Analysis of these differences? Clues to uncertainties?

f. Are schedules consistent with OSD/Congressional constraints?

5. *PROGRAM MANAGEMENT.*

a. What is the Army management staff for this program? Adequate? Project Manager tenure and that of his key personnel?

b. How will contractor be managed (monitor, control)? Is MIL STD 881 and DODD 7000.1 being implemented?

c. Government and contractor cost, schedule, technical performance reporting systems? How close to real time on major aspects?

d. For Joint Service Program—have Joint Service Operating Procedures been developed? If not explain.

e. How will change control be managed? How will change proposals be reviewed to insure that they are limited to those that are necessary or offer significant benefit to the Army?

f. Have discrete cost elements (e.g., unit production cost, operating and support cost) been translated into "design to" requirements?

6. *PROCUREMENT/ASSESSMENT.*

a. Has Advance Procurement Plan (APP) been submitted to ASA (I&L), ASA (R&D), and ASD (I&L) for review?

b. Procurement plan matched to program and risks? Contract type consistent with risks? Contractual Achievement Milestones?—associated contract options? Have provisions for formal trade-off analyses been incorporated into development plan?

c. Contract negotiated while competition existed? Contract incentives? Do they motivate? Importance to us?

d. Advantageous features of contract from Government view: Contractor's? What is Government liability at each stage of contract?

e. Additional commitments by contractor, e.g., production options? Adequate flexibility for Government?

f. What happens if contractor gets in trouble? What options does the Government have?

g. Is this a "buy-in"? Any contract features to help contractor "get well"? Prevent him from "getting well"? Has suspected "buy-in" been discussed with bidder's top management?

h. How did the source selection take into account the contractor's capability to develop a necessary defense system on a timely and cost-effective basis?

7. *CONTRACTOR AND PROPOSAL.*

a. Best contractor or best proposal? How better? Strong points? Weak points?

b. Difference in evaluation of competing proposals? Winner best in which areas? Are they the most important areas?

c. Competence of winner and loser, judged by Validation Phase effort alone? Past records of competitor (cost, schedule, performance)? Other factors evaluated? Is contractor's engineering/test/production staff adequate to adhere to program objectives?

d. RFP and reports SCRUB? Indicate what was done to scrub the RFP and proposal of unnecessary and marginal requirements for performance, management and data requirements. Identify the documentation that could be reduced or eliminated.

8. *ASARC/DSARC REVIEWS INVOLVING SOURCE SELECTION.*

a. Unsuccessful bidder status? Provide summary comparing the proposed programs of unsuccessful bidders with winning bidder.

b. Credibility of cost/performance proposed?

c. Did any bidder claim that Government requirements were unrealistic?

9. *SECURITY.*

Summarize the security classification of the program, system, co -ponents, technical characteristics and any other aspects of the progr a requiring classification.

CHECKLIST FOR MILESTONE IIa REVIEWS

(LOW RATE INITIAL PRODUCTION)

Purposes of Milestone IIa ASARC/DSARC.

The purpose of the Milestone IIa ASARC/DSARC review is to develop a recommendation for the Secretary of the Army or SEC/DEF on transitioning a weapon system into a low rate initial production. Such production is authorized for the basic purpose of obtaining a quantity of representative production prototype test items. The factors to be considered in authorizing a low rate initial production of major systems involve a combination of test, development lead time, economic factors, and a production rate consistent with retention of the management, engineering, and production skills which are essential to program integrity and learning. These factors should be kept in mind in following this checklist. The Milestone IIa review will be conducted at such time that the Army has determined that—

a. Development testing and operational testing (DT/OT) have been accomplished such that important characteristics were tested sufficiently enough to indicate major developmental problems and critical operational issues have been or should be satisfactorily resolved by the end of development.

b. The system still satisfies a valid military need or ROC, responds to the current threat, is still worth its projected costs, and is of sufficient priority to be funded within overall fiscal constraints.

c. Initial Producibility Engineering and Planning (PEP) has been sufficiently conducted to indicate confidence in production planning, estimated costs and results. PEP consists of those planning and engineering measures undertaken to insure the timely and economic producibility of essential materiel. PEP generally includes data packages, e.g., engineering drawings, bills of materials, quality assurance procedures, planning for plant layouts, parts lists, and descriptions of manufacturing procedures. In some cases, PEP may also include the design of some special purpose production equipment, tooling and computer modeling/simulation of manufacturing processes to confirm producibility.

d. Development and production risks have been identified. The remainder of the development phase, development and operational testing, (DT/OT) and PEP will deliberately address such risks as evidenced in updated DCP/DPM/APM Development Plans and Coordinated Test Programs.

e. System definition (specifications, drawings and associated documentation) incorporate initial findings of the development and DT/OT efforts are adequate for low rate initial production purposes. When will competition be introduced into the production phase. If none planned, why?

f. The contractual aspects are sound for the remainder of development and for low rate initial production.

g. DCP/DPM/APM thresholds are sufficiently defined to assure identification of major development and production program variances.

h. Analyses (trade-off, threat, risk, parametric cost, cost and effectiveness, vulnerability to hostile EW and SIGINT efforts, communications-electronics considerations, and logistic support) confirm the desirability of making the transition to low rate initial production. New analyses to support the Milestone III review and decision process are planned and programed.

i. Initial issue quantity requirements for major systems will be displayed by projections of the BOIP in the Structure and Composition System (SACS).

1. *BACKGROUND.*

a. Review program objectives including:

(1) Significant program changes that occurred during development.

(2) Description of the original program goals (life cycle costs, schedule, and performance) compared with current expectations, to include how well the "design-to" estimates were met as evidenced during initial DT/OT.

b. Provide brief summary of the operational need and mission requirements, per revised section I of the Development Plan, including:

(1) Concept analysis.

(2) Cost-benefit trade-off analysis. Quantity versus quality should be revalidated in terms of realistic missions and forces.

(3) Current and anticipated threat—if a range exists in the intelligence community, provide it.

(4) Related tactics and doctrine.

(5) Reasons for requiring a new system, including operation and support personnel costs as well as materiel costs and technical comparisons with systems to be replaced or supplemented.

2. *OPERATIONAL AND TECHNICAL ASSESSMENT.*

Assesses the status of weapon system and the major subsystems and components to—

a. Assure that necessary preproduction prototype testing to include operational testing is programed or pilot production technical and op-

erational testing is programed, both to assure the meetings of performance bands, specified technical criteria and those necessary to estimate operational effectiveness, suitability (including reliability, availability, maintainability (RAM), electromagnetic compatibility, EW vulnerability, and training requirements), and optimization of tactics. Assure that testing confirms compatibility with other systems and equipment it must operate within the field. Assure that testing validates the possible basis of issue (BOI).

b. Establish that sufficient design and performance band achievement milestones (prerequisites to low rate initial production) have been achieved, and all major problems can be identified, resolved or appropriate trade-offs made.

c. Assure EW vulnerability testing in actual or simulated operational EW/SIGINT environment. Assess the ability of the system to operate effectively in relation to expected EW/SIGINT threat.

d. Contractual Reliability and Maintainability Requirements? Contractual test provisions? Incentives?

e. Determine the status of type classification and the T&E on which it was (or will be based).

f. Determine the status of PEP and if preliminary technical data package (specifications, drawings, test procedures, etc.) is sufficiently complete, reflects the tested prototype and is adequate as a basis for low rate initial production.

g. Address those operational (performance band) requirements which were not proved by the testing program as well as those for which tests indicated a performance shortfall. These characteristics should be acknowledged by the user and acceptability of the shortfall certified.

h. Plan to submit Army test results and assessments, in terms c response to initial questions or issues previously identified, to DDRE fo evaluation. This will include the results of initial operational tests an the initial independent evaluation of operational effectiveness and sui ability.

i. Assess weapon system configuration to determine if any significant design changes may be required for full-scale production engineering.

j. Environmental pollution control features have been specifically evaluated and an environmental impact statement (EIS) prepared, if appropriate.

3. *PRODUCTION AND PROCUREMENT ASSESSMENT.*

Recognizing that significant unknowns can develop during the transition from development to low rate initial production, the following Producibility Engineering and Planning (PEP) data should be furnished:

a. Production.

(1) Identify product assurance controls or tests established to pre-

vent degradation of technical design performance parameters in the transition from development to low rate initial production.

(2) Outline efforts for minimizing production risks.

(3) Identify potential production impact on other weapon systems.

(4) Delineate production and contract options e.g., phase down plans and work stoppage options, or change production schedules up or down.

(5) Provide status of pilot production, if appropriate.

(6) Provide a planned production schedule.

(7) Provide the plan and schedules for later test and evaluation to be accomplished to confirm that the product does, in truth, meet technical criteria, that the operational test and evaluation findings remain valid, and that doctrine and tactics for use do optimize mission and force effectiveness at least long-term costs.

b. Producibility.

(1) Describe production line planning.

(2) Determine that initial facilities surveys have been completed, include status of accessory and ancillary items; test and training equipment.

c. Procurement.

(1) Identify the criteria for contractor selection. Explain how the source selection decision took into account the contractor's capability to produce a necessary defense system on a timely and cost effective basis.

(2) Explain the type of proposed low rate initial production contract with a review of procurement methodology employed by involved DOD and Army agencies and reasons therefore. This review will include a summary of the procurement review process and bring out these three points:

(*a*) Any special provisions such as Total Systems Performance Responsibility, Escalation, or special funding arrangements with the rationale for their use.

(*b*) That the contract, if available, or the Determinations and Findings (D&F), has been analyzed to insure that the interrelationship of provisions is understood and that they are compatible with the intent of the future contract.

(*c*) That specifications and exhibits to the future contract have been reviewed for accuracy, completeness, and compatibility in context with the procurement, and that they are adequate for the intended low rate initial production.

(3) Describe the size of first low rate initial production buy, basis for quantity, follow-on quantities, and Government options.

(4) Discuss the principal subsystems which are GFE, CFE: and why; provide an evaluation of the proposed vendor's capability to produce these items.

(5) State the actions taken in the RFP to eliminate unnecessary and marginal performance, management and data requirements. Are there any reports required by directives or regulations which appear to be unnecessary?

(6) Describe Value Engineering (VE) provisions to be included in the contract; estimate costs of these provisions.

Note. Has a current Advance Procurement Plan been submitted to ASD(I&L)?

(7) Describe configuration management plan and contractor performance measurement with delineated contractor and government responsibilities and authorities.

4. *SCHEDULES.*

a. Identify features in the low rate initial production start-up schedule which minimizes financial commitments until all major development problems and operational issues have been resolved. Appropriate information from other DOD agencies involved in developing supporting subsystems may be included in ASARC reviews.

b. Depict the status of the pacing and long leadtime items.

c. Identify possible slippage or production risk.

d. Identify those external factors which may effect program, e.g., delays in delivery of GFE, labor stoppages, results of DT/OT, etc.

e. Review the concurrency and schedules compressions as they relate to additional resources and management actions required, and the gains versus risks.

5. *COSTS.*

a. Explain fully low rate initial production cost estimates and include:

(1) Comparison of production costs with similar programs and with approved DCP (DSARC I) projections. Should cost analysis (if appropriate).

(2) Price out of program alternatives; indicate options to reduce costs expressed in terms of constant year and then year dollars.

(3) Cost projections including funding requirements by FY.

b. Provide a depiction of cost estimating techniques used and include—

(1) OSD/Army estimates, and planned budget.

(2) Projected escalation, system acquisition, life cycle costs, and logistic support costs.

c. Define management control systems and data costs and the approximate ratio of these costs to hardware costs.

d. A review of cost history which traces estimates and costing factors including those for economic escalation.

6. *PROGRAM MANAGEMENT.*

Review the plan for overall program management to determine that the Army management concept is tailored to program and contract type; determine compliance with major OSD guidance, such as, 28 May 1970 memorandum from Deputy Secretary of Defense, and DODD 5000.1.

7. *OTHER.*

a. Ascertain that the program proposed to go forward is consistent with the DCP/DPM/APM and its thresholds.

b. Indicate that the next SAR, if required, will be consistent with DCP with respect to the rationale on which the production decision is based.

c. Give assurance that an integrated logistic support plan complying with DODD 4100.35 and DODD 3224.1 has been implemented.

d. Depict configuration control techniques.

e. Describe management systems used to control costs, schedule, and technical performance; reports required.

f. Discuss the operational, technical, scheduling, costs, procurement, and program management considerations of indirect or "spillover" effects of the system.

g. Provide the following information, as appropriate:
(1) Candidate contractors' historical performance record.
(2) Status of candidate contractors' purchasing systems, including approval of make or buy plans.
(3) Compliance with provisions of Armed Services Procurement Regulation and Public Law 87–653.
(4) Compliance with Equal Employment Opportunity (EEO).
(5) Proprietary Rights Issues.
(6) Political issues and/or special congressional interest.
(7) Description of performance incentive(s) contained in proposed low rate initial production contract.

8. *ASARC/DSARC REVIEWS INVOLVING SOURCE SELECTION.*

Provide information comparing the proposed programs of unsuccessful bidders with the winning proposal.

9. *SECURITY.*

Summarize the security classification of the program, system, components, technical characteristics and any other aspects of the program requiring classification.

10. *DSARC REVIEWS.*

OSD may require special DSARC reviews between Milestones II and III. This checklist is intended for such reviews and for the ASARC IIa review for the Army's low rate initial production decision.

CHECKLIST FOR MILESTONE III REVIEWS

(END OF DEVELOPMENT AND BEGIN FULL-SCALE PRODUCTION)

Purpose of Milestone III ASARC/DSARC.

The purpose of the Milestone III DSARC review is to develop a recommendation for the Deputy Secretary of Defense on moving a weapon system into production. This review will form the basis for the decision to produce the system for deployment. DSARC III meetings will be held at such time that the Army has determined that—

a. Engineering and operational systems development and testing, including the necessary initial operational testing and evaluation have been substantially completed and all major development problems have been resolved.

b. The cost and importance warrant production and deployment of the system that has been tested, evaluated by trade-off analysis and defined.

c. System definition (specifications, drawings and associate documentation) incorporate the total findings of the development effort and are adequate for production. Can competition be used for the initial produ tion contract? If not, why? When is competition for production plannec

d. Schedule and cost estimates and commitments are credible ar acceptable.

e. DCP thresholds are sufficiently defined to ensure identification of major production program variances.

f. The production plans and personnel and logistics support plans are acceptable.

g. Sufficient progress has been made toward a negotiated contract to justify transition to the Production Phase.

h. Contractual conditions are sound.

i. Analyses (trade-off, parametric cost, cost and effectiveness supported test data) are adequate to confirm there is a need for producing the defense system in consideration of threat, estimated acquisition and ownership costs and potential benefits in context with overall Army strategy and fiscal guidance.

j. Test data and analyses exist to assure that all previously identified technical uncertainties have been resolved.

k. Threat is still credible (conforms with the AAI or has been coordinated with ACSI).

l. If a competitive program is being addressed, a clear winner has been established.

n. Initial issue quantity requirements for major systems will be displayed by projection of the BOIP in the Structure and Composition System (SACS).

1. *BACKGROUND.*

a. Review program objectives including:

(1) Significant program changes that occurred during development of the original DCP (DSARC I) program goals.

(2) Description of the original program goals (life cycle costs, schedule, and performance) compared with current expectations, to include how well the "design-to" estimates were met.

b. Provide brief summary of the operational need and mission requirements, as reflected in the ROC, including:

(1) Concept analysis.

(2) Cost-benefit trade-off analysis.

(3) Current and anticipated threat—if a range exists in the intelligence community, provide it.

(4) Related tactics and doctrine.

(5) Reasons for requiring a new system, including operation and support personnel costs as well as materiel costs and technical comparisons with systems to be replaced or supplemented.

2. *OPERATIONAL AND TECHNICAL ASSESSMENT.*

a. Status of development. Review the status of weapon system and the major subsystems and components to—

(1) Assure that necessary preproduction prototype testing to include operational testing is completed or pilot production technical and operational testing is completed, both to assure the meeting of specified technical criteria and those necessary to estimate operational effectiveness, suitability (including reliability, maintainability and training requirements), and optimization of tactics. Assure that testing validates the BOI and confirms compatibility with other systems and equipment it will operate with in the field.

(2) Establish that all the design and performance band achievement milestones (prerequisites to production) have been achieved, and all major problems resolved or appropriate trade-offs made.

(3) Contractual Reliability and Maintainability requirements? Contractual test provisions? Incentives?

criteria, that the initial operational test and evaluation findings remain valid, and that doctrine and tactics for use do optimize mission effectiveness at least long-term costs. Assure that testing validates the BOI and confirms the compatibility of the system with other systems and equipment it must operate within the field.

b. Producibility.

(1) Describe the readiness of the production line.

(2) Determine that facilities surveys have been completed, include status of accessory and ancillary items; test and training equipment.

c. Procurement.

(1) Identify the criteria for contractor selection. Explain how the source selection decision took into account the contractor's capability to produce a necessary defense system on a timely and cost effective basis.

(2) Explain the type of proposed production contract with a review of procurement methodology and reasons therefore. This review will include a summary of the procurement review process and bring out these three points:

(*a*) Any special provisions such as total systems performance responsibility, escalation, or special funding arrangements with the rationale for their use.

(*b*) That the contract has been analyzed to insure that the interrelationship of provisions is understood and that they are compatible with the intent of the contract.

(*c*) That specifications and exhibits to the contract have been reviewed for accuracy, completeness, and compatibility in context with the procurement, and that they are adequate for the intended production.

(3) Describe the size of first production buy, basis for quantity, follow-on quantities, and Government options.

(4) Discuss the principal subsystem which are GFE, CFE: and why; provide an evaluation of the vendor's capability to produce these items.

(5) State the actions taken in the RFP to eliminate unnecessary and marginal performance, management and data requirements. Are there any reports required by directives or regulations which appear to be unnecessary?

(6) Provide environmental impact statements (EIS) for each procurement alternative, if appropriate.

(7) Describe Value Engineering (VE) provisions to be included in the contract; estimate costs of these provisions.

Note. Has a current Advance Procurement Plan been submitted to ASD(I&L)?

(8) Describe configuration management plan with delineated contractor government responsibilities and authorities.

(9) Assure that a production unit cost has been incorporated in the RFP.

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(8) Describe configuration management plan with delineated contractor government responsibilities and authorities.

(9) Assure that a production unit cost has been incorporated in the RFP.

4. *SCHEDULES.*

a. Identify features in the production start-up schedule which minimize financial commitments until all major development problems and operational issues have been resolved.

b. Depict the status of the pacing items.

c. Identify possible slippage.

d. Identify those external factors which may effect program, e.g., delays in delivery of GFE, labor stoppages, etc.

e. Review the concurrency and schedules compression as they relate to additional resources and management actions required, and the gains versus risks.

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a. Explain fully production cost estimates and include:

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(3) Cost projections including funding requirements by FY.

b. Provide a depiction of cost estimating techniques used and include:

(1) OSD/Army estimates, contractor's estimate, and planned budget.

(2) Projected escalation, system acquisition, life cycle costs, and logistic support costs.

c. Define data costs and the approximate ratio of data costs to hardware costs.

d. A review of cost history which traces estimates and costing factors including those for economic escalation.

6. *PROGRAM MANAGEMENT.*

Review the plan for overall program management to determine that the Army management concept is tailored to program and contract type; determine compliance with major OSD guidance, such as, 28 May 1970 memorandum from Deputy Secretary of Defense, and DODD 5000.1.

7. *OTHER.*

a. Ascertain that the program proposed to go forward is consistent with the DCP/DPM/APM and its thresholds.

b. Indicate that the SAR is consistent with DCP with respect to the rationale on which the production decision is based.

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d. Depict configuration control techniques.

e. Describe management systems used to control costs, schedule, and technical performance; reports required.

f. Discuss the operational, technical, scheduling, costs, procurement and program management considerations of indirect or "spillover" effects of the system.

g. Provide the following information, as appropriate:

(1) Contractor's historical performance record.

(2) Status of contractor's purchasing system, including approval of make or buy plans.

(3) Compliance with provisions of Armed Services Procurement Regulation and Public Law 87-653.

(4) Compliance with Equal Employment Opportunity (EEO).

(5) Proprietary Rights Issues.

(6) Political issues and/or special congressional interest.

(7) Description of performance incentive(s) contained in contract.

8. *ASARC/DSARC REVIEWS INVOLVING SOURCE SELECTION.*

Provide information comparing the proposed programs of unsuccessful bidders with the winning proposal.

9. *SECURITY.*

Summarize the security classification of the program, system, components, technical characteristics and any other aspects of the program requiring classification.

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The purpose of this thesis is to provide a flexible guide for the project manager, to be used in the preparation of the Defense Systems Acquisition Review Council (DSARC) presentation. The authors have emphasized factors which relate to the non-technical aspects of the presentation because they believe knowledge of these characteristics will substantially aid the project manager. Technical considerations which comprise the framework of any project are also included, but only from a broad viewpoint. Specific detail was avoided because each DSARC review will have its own areas of emphasis. Therefore, the authors consider that a discussion and compilation of the non-technical and technical factors, which this thesis accomplishes, will provide the project manager a base from which to direct the preparation of a DSARC presentation.

KEY WORDS	LINK A		LINK B		LINK C	
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Non-technical Considerations						
Technical Considerations						
Flexible Guide						
Existing Checklists						

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